Rocky Flats Environmental Technology Site

RECONNAISSANCE LEVEL CHARACTERIZATION REPORT (RLCR)

BUILDING 989, 992 & 993 CLOSURE PROJECT

REVISION 0

August 20, 2002

CLASSIFICATION REVIEW NOT REQUIRED PER EXEMPTION NUMBER CEX-005-02

1/84

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REVISION 0

August 20, 2002

Reviewed by: R.D. Taggart for Date: 8/27/02
Paul Miles, Quality Assurance

Reviewed by: D D Snyder Date: 8/27/02
Duke Snyder, RISS ESH&Q Manager

Approved by: Karen L Wiemelt Date: 8/27/02
Karen Wiemelt, K-H Project Manager

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ABBREVIATIONS/ACRONYMS

ACM	Asbestos containing material
Be	Beryllium
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Emergency Response, Compensation and Liability Act
$DCGL_{EMC}$	Derived Concentration Guideline Level – elevated measurement comparison
$DCGL_W$	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
FDPM	Facility Disposition Program Manual
HVAC	Heating, ventilation, air conditioning
HSAR	Historical Site Assessment Report
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
K-H	Kaiser-Hill
LBP	Lead-based paint
LLW	Low-level waste
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum detectable activity
MDC	Minimum detectable concentration
NORM	Naturally occurring radioactive material
NRA	Non-Rad-Added Verification
OSHA	Occupational Safety and Health Administration
PARCC	Precision, accuracy, representativeness, comparability and completeness
PCBs	Polychlorinated Biphenyls
PDS	Pre-demolition survey
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TSA	Total surface activity
VOCs	Volatile organic compounds

EXECUTIVE SUMMARY

A Reconnaissance Level Characterization (RLC) was performed to enable facility "Typing" per the DPP (10/8/98) and compliant disposition and waste management of Buildings 989, 992 & 993. Because these facilities are anticipated to be Type 1 facilities, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). All facility surfaces were characterized in this RLC, including the interior and exterior surfaces [i.e., floors (slabs), walls, ceilings and roofs]. Environmental media beneath and surrounding the facilities were not within the scope of this RLCR and will be addressed at a future date using the Soil Disturbance Permit process and in compliance with RFCA.

The RLC encompassed both radiological and chemical characterization to enable compliant disposition and waste management pursuant to the D&D Characterization Protocol (MAN-077-DDCP). The characterization built upon physical, chemical and radiological hazards identified in the facility-specific Historical Site Assessment Report.

Results indicate that no radiological contamination exists in excess of PDSP unrestricted release limits of DOE Order 5400.5. Although all accessible portions of the 993 slab were less than the PDSP unrestricted release limits of DOE Order 5400.5, there is historical knowledge that the 12 foot diameter, 8 foot deep, under-grade pit in the slab 993 may potentially contain depleted uranium contamination. Since the under-grade pit has been filled in with concrete making the pit inaccessible for surveys and sampling, the 993 under-grade pit is assumed to be radiologically contaminated and will be managed as such during demolition and environmental restoration.

Category 1 and 2 non-friable asbestos containing building materials were identified in Building 992. No asbestos containing building materials were located in Buildings 989 and 993. All beryllium sample results were less than 0.1 $\mu g/100cm^2$. Fluorescent light ballasts may contain PCBs. Any PCB ballasts, asbestos containing materials, and hazardous-waste items will be managed and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations. All demolition debris will be managed in compliance with regulations governing PCB Bulk Product Waste (40 CFR 761), and Environmental Compliance Guidance #27, *Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal,* as applicable. All concrete associated with these facilities meet the criteria for recycling concrete per the RFCA RSOP for Recycling Concrete, except for the 12 foot diameter under-grade pit located in the slab of 993.

Based upon this RLCR and subject to concurrence by the CDPHE, 989 and 992 facilities are considered to be Type 1 facilities, and 993 facility is considered to be Type 2 facility. To ensure that the facilities remain free of contamination and that RLC data remain valid, isolation controls have been established, and the facilities have been posted accordingly.

1 INTRODUCTION

A Reconnaissance Level Characterization (RLC) was performed to enable compliant disposition and waste management of Buildings 989, 992 & 993. Because these facilities were anticipated to be Type 1 facilities, a PDS characterization was performed. All facility surfaces were characterized in this RLC, including the interior and exterior surfaces of the facilities [i.e., floors (slabs), walls, ceilings and roofs]. As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous facilities will be removed. Among these are the 989, 992 and 993 facilities. The locations of these facilities are shown in Attachment A. These facilities no longer support the RFETS mission and need to be removed to reduce Site infrastructure, risks and/or operating costs.

Before the facilities can be removed, a Pre-Demolition Survey (PDS) must be conducted; this document presents the PDS results. The PDS was conducted pursuant to the Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The PDS built upon physical, chemical and radiological hazards identified in the facility-specific Historical Site Assessment Report.

1.1 Purpose

The purpose of this report is to communicate and document the results of the RLC effort. The PDS is performed before building demolition to define the final radiological and chemical conditions of a facility. Final conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

1.2 Scope

This report presents the final radiological and chemical conditions of the 989, 992 and 993 facilities. Environmental media beneath and surrounding the facilities are not within the scope of this RLCR and will be addressed using the Soil Disturbance Permit process in compliance with RFCA.

1.3 Data Quality Objectives

The Data Quality Objectives (DQOs) used in designing this RLC were the same DQOs identified in the Pre-Demolition survey Plan for D&D Facilities (MAN-127-PDSP.) Refer to section 2.0 of MAN-127-PDSP for these DQOs.

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2 HISTORICAL SITE ASSESSMENT

Facility-specific Historical Site Assessments (HSAs) were conducted to understand facility histories and related hazards. The assessments consisted of facility walkdowns, interviews, and document review, including review of the Historical Release Report (refer to the D&D Characterization Protocol, MAN-077-DDCP). Results were used to identify data gaps and needs, and to develop radiological and chemical characterization packages. Results of the facility-specific HSAs were documented in a facility-specific Historical Site Assessment Report (HSAR) for Area 2, Group 4 (refer to Attachment B). In summary, the HSAR identified no potential for chemical hazards, except the potential for asbestos containing materials and PCBs in paint and light ballasts. The HSAR did identify a potential for depleted uranium contamination in the 12 foot diameter, 8 foot deep, under-grade pit located in the slab of 993. The pit was used for explosive bonding testing during the 1960's and 1970's, and was later filled in with concrete in the 1970's. Depleted uranium alloys were sometimes used during the explosive bonding testing.

3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

The 989, 992 and 993 facilities were characterized for radiological hazards per the PDSP. Radiological characterization was performed to define the nature and extent of radioactive materials that may be present on the facility surfaces. Measurements were performed to evaluate the contaminants of concern. Based upon a review of historical and process knowledge, building walk-downs, and MARSSIM guidance, a Radiological Characterization Plan was developed during the planning phase that describes the minimum survey requirements (refer to the RISS Characterization Project files).

Six radiological survey packages were developed (two per facility – one for the interior and one for the exterior). The survey packages were developed in accordance with Radiological Safety Practices (RSP) 16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure*. Total surface activity (TSA), removable surface activity (RSA), and scan measurements were collected in accordance with RSP 16.02 *Radiological Surveys of Surfaces and Structures*. Radiological survey data were verified, validated and evaluated in accordance with RSP 16.04, *Radiological Survey/Sample Data Analysis*. Quality control measures were implemented relative to the survey process in accordance with RSP 16.05, *Radiological Survey/Sample Quality Control*. Radiological survey data, statistical analysis results, and survey locations are presented in Attachment C, Radiological Data Summary and Survey Maps. The radiological survey unit packages are maintained in the RISS Characterization Project files.

TSA measurements (15 random and 2 QC) and RSA measurements (15 random) were taken within each survey unit, and 5% scan surveys were performed within each survey unit as indicated on the blue shaded area of the survey maps. The PDS confirmed that the 989, 992 and 993 facilities do not contain radiological contamination above the surface contamination guidelines provided in the PDSP. Although all accessible portions of the 993 slab were less than the PDSP unrestricted release limits of DOE Order 5400.5, there is historical knowledge that the 12 foot diameter, 8 foot deep, under-grade pit in the slab of 993 may potentially contain depleted uranium contamination. The pit was used for

explosive bonding testing during the 1960's and 1970's, and was later filled in with concrete in the 1970's. Depleted uranium alloys were sometimes used during the explosive bonding testing. Since the under-grade pit has been filled in with concrete, thus making the pit is inaccessible for surveys and sampling, the 993 under-grade pit is assumed to be radiologically contaminated and will be managed as such during demolition and environmental restoration.

Initial surveys on at several locations on the exteriors of B989, B992 and B993 indicated elevated activity. Subsequent investigations showed that all of the elevated activity meets the PDSP unrestricted release limits for both transuranics and uranium. Refer to the applicable data summaries in Attachment C, Radiological Data Summary and Survey Maps, for details on the investigation results.

Isolation control postings are displayed on affected structures to ensure no radioactive materials are introduced.

4 CHEMICAL CHARACTERIZATION AND HAZARDS

The 989, 992 and 993 facilities were characterized for chemical hazards per the PDSP. Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present on or in the facilities. Based upon a review of historical and process knowledge, visual inspections, and PDSP DQOs, additional sampling needs were determined. A Chemical Characterization Package (refer to RISS Characterization Project files) was developed during the planning phase that describes sampling requirements and the justification for the sample locations and estimated sample numbers. Contaminants of concern included asbestos, beryllium, RCRA/CERCLA constituents, and PCBs. Refer to Attachment D, Chemical Data Summaries and Sample Maps, for details on sample results and sample locations.

4.1 Asbestos

A survey of building materials suspected of containing asbestos was conducted in the aforementioned buildings in accordance with the PDSP. A CDPHE-certified asbestos inspector conducted the inspection and sampling in accordance with the *Asbestos Characterization Protocol, PRO-563-ACPR, Revision 1.* Building materials suspected of containing asbestos were identified for sampling at the discretion of the inspector.

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All samples of suspect friable building materials were negative for asbestos. Category 1 and 2 non-friable asbestos containing building materials were identified in Building 992 as follows:

Building	Material	Non-Friable	Quantity
992	9" tan vinyl floor tile	Category 1	64 square feet
992	Black fibrous tar with silver paint at AC unit, second floor exterior	Category 1	5 square feet
992	Green Transite wall panel	Category 2	280 square feet
992	Tan window caulking with tan paint	Category 2	80 lineal feet

The tan 9" x 9" vinyl floor tiles on the second floor of the 992 Guard Tower tested 15% positive for Chrysotile by PLM analysis. The mastic adhesives were "None Detected." The green Transite wall units were 27% Chrysotile. The exterior tan window caulking was 2.5% Chrysotile by *Point Counting*. The black, fibrous tar with silver paint that insulates the second floor exterior air conditioning unit tested 25% Chrysotile. Asbestos laboratory analysis data and location maps are contained in Attachment D, "Chemical Data Summaries and Sample Maps." Maps that did not contain any sample locations were not included in this report.

4.2 Beryllium (Be)

Based on the HSAR and personnel interviews, these buildings were anticipated Type 1 facilities. However, there was not adequate historical and process knowledge to conclude that beryllium was not used or stored in these buildings. Therefore, biased beryllium sampling was performed in accordance with the PDSP and the *Beryllium Characterization Procedure, PRO-536-BCPR, Revision 0, September 9, 1999.* Biased sample locations corresponded with the most probable areas of dust accumulation (including beryllium dust), assuming airborne deposition.

All beryllium smear sample results were less than 0.1 $\mu g/100cm^2$. Beryllium laboratory sample data and location maps are contained in Attachment D, "Chemical Data Summaries and Sample Maps." Maps that did not contain any sample locations were not included in this report.

4.3 RCRA/CERCLA Constituents [including metals and volatile organic compounds (VOCs)]

Based on the HSAR, interviews and facility walkdowns of the 989, 992 and 993 facilities, there are no RCRA/CERCLA concerns. None of the buildings have a history of spills or releases of RCRA/CERCLA regulated materials, and there were no observations to suggest contamination. Therefore, RCRA/CERCLA constituent sampling was not performed in these facilities. Similar to buildings 827 and 881, Building 989 has a stained and corroded area beneath the battery rack. Core samples taken in 827 and 881 have shown that these areas are a result of sulfuric acid leaking from the batteries, and do

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not contain lead or other RCRA metals. There is no remaining acid on the 989 slab and the pH of the affected area is not a RCRA concern, therefore no sampling was required.

Building 993 contained a "Special Material Storage" area listed on "The Master List of RCRA Units" as a Permitted Area, Unit 993.1. Also, Dynamite was used in the explosive-forming tests performed in a 12 foot diameter pit in the floor. There is no evidence of residue from these activities on the building surfaces, and residues concealed within the explosive test pit are not a RCRA/CERCLA concern, therefore no sampling was required.

The buildings may contain some RCRA regulated items, such as mercury thermostats, fluorescent light bulbs, mercury vapor light bulbs, mercury containing gauges, circuit boards, leaded glass and lead-acid batteries. These items will be removed prior to demolition and managed in accordance with the CHWA.

Sampling for lead in paint in the facilities was not performed. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes, and additional analysis for characteristics of hazardous waste derived from LBP is not a requirement for disposal.

4.4 Polychlorinated Biphenyls (PCBs)

Based on the HSAR, interviews and facility walkdowns of the 989, 992 and 993 facilities, no PCB-containing equipment or wastes were ever present in the buildings, making the potential for PCB contamination resulting from spills highly unlikely. Therefore, PCB sampling was not performed. Based on the age of buildings (constructed prior to 1980), paints used may contain PCBs, and painted surfaces will need to be disposed of PCB Bulk Product Waste. Painted concrete surfaces can be used as on site backfill in accordance with approval received from EPA in November 2001 [letter from K. Clough, US EPA Region 8, to J. Legare, DOE RFFO, 8EPR-F, Approval of the Risk-Based Approach for Polychlorinated Biphenyls (PCB)-Based Painted Concrete,] provided the concrete meets the unrestricted-release criteria outlined in the Concrete Recycling RSOP.

Because some facilities may contain fluorescent light ballasts containing PCBs, fluorescent light fixtures will be inspected to identify PCB ballasts during removal operations. PCB ballasts will be identified based on factors such as labeling (e.g., PCB-containing and non-PCB-containing), manufacturer, and date of manufacturing. All ballasts that do not indicate non-PCB-containing are assumed to be PCB-containing.

5 PHYSICAL HAZARDS

Physical hazards associated with the 989, 992 and 993 facilities consist of those common to standard industrial environments and include hazards associated with energized systems, utilities, and trips and falls. Refer to the Site Safety Analysis Report (PADC-1998-00662). The 993 building has a 12 foot diameter, 8 foot deep, under-grade pit that was used for explosive bonding testing during the 1960's and 1970's, and was later filled in with concrete in the 1970's. Depleted uranium alloys were sometimes used during the explosive bonding testing. Care should be taken when disposing of the pit since it may be heavy and awkward. The facilities have been relatively well maintained and are in good physical condition, and therefore, do not present hazards associated with building deterioration. Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

6 DATA QUALITY ASSESSMENT

Data used in making management decisions for decommissioning of the 989, 992 and 993 facilities, and consequent waste management, are of adequate quality to support the decisions documented in this report. The data presented in this report (Attachments C and D) were verified and validated relative to DOE quality requirements, applicable EPA guidance, and original DQOs of the project.

In summary, the Verification and Validation (V&V) process corroborates that the following elements of the characterization process are adequate:

- the *number* of samples and surveys;
- the *types* of samples and surveys;
- the sampling/survey process as implemented "in the field"; and,
- the laboratory analytical process, relative to accuracy and precision considerations.

Details of the DQA are provided in Attachment E.

7 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES

The demolition and disposal of the 989, 992 and 993 facilities will generate a variety of wastes. Estimated waste types and waste volumes are presented below by facility. All wastes can be disposed of as sanitary waste, except asbestos containing material, PCB Bulk Product Waste, and hazardous-waste items (mercury thermostats, fluorescent light bulbs, mercury vapor light bulbs, mercury containing gauges, circuit boards, leaded glass and lead-acid batteries). The 12 foot diameter under-grade pit located in the slab of 993 will be managed as radiological waste during demolition (approximately 905 cubic feet of LLW). Asbestos, PCB ballasts, and hazardous-waste items will be removed prior to demolition and disposed of pursuant to Site asbestos abatement and waste management procedures.

Waste Volume Estimates and Material Types							
Facility	Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM (cu ft)	Other Waste (cu ft)
989	3,200	None	240	None	None	None	Pipe insulation – 60
992	2,500	None	1,200	None	300	270	Window glass – 400 Mercury vapor lights – 4 Pipe insulation – 60 Wall/ceiling insulation – 200
993	5,000	30	800	3,500	None	None	Window glass – 30 Mercury vapor lights – 4 LLW Under-grade Pit (concrete) – 905

8 FACILITY CLASSIFICATION AND CONCLUSIONS

Based on the analysis of radiological, chemical and physical hazards, 989 and 992 facilities are classified as RFCA Type 1 facilities, and the 993 facility is classified as a RFCA Type 2 facility pursuant to the RFETS Decommissioning Program Plan (DPP; K-H, 1999). These Type 1 and 2 classifications are based on a review of historical and process knowledge, and newly acquired RLC data, and will be subject to concurrence by the Colorado Department of Public Health and the Environment (CDPHE).

The RLC of the 989, 992 and 993 facilities was performed in accordance with the DDCP and PDSP, all PDSP DQOs were met, and all data satisfied the PDSP DQA criteria. Except for the 993 under-grade pit, these facilities do not contain radiological waste. The 12 foot diameter, 8 foot deep, under-grade pit located in the slab of 993 will be managed as radiological waste during demolition and environmental restoration. Any PCB ballasts, asbestos containing materials, and hazardous-waste items will be removed prior to demolition and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations. All demolition debris will be managed in compliance with regulations governing PCBs (40 CFR 761), and Environmental Compliance Guidance #27, *Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal,* as applicable. All concrete associated with these facilities meet the criteria for recycling concrete per the RFCA RSOP for Recycling Concrete, except for the under-grade pit located in the slab of 993. Environmental media beneath and surrounding the facilities will be addressed at a future date using the Soil Disturbance Permit process and in compliance with RFCA.

To ensure that the facilities remain free of contamination and that PDS data remain valid, isolation controls have been established, and the facilities are posted accordingly.

9 REFERENCES

DOE/RFFO, CDPHE, EPA, 1996. Rocky Flats Cleanup Agreement (RFCA), July 19, 1996.

DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

EPA, 1994. "The Data Quality Objective Process," EPA QA/G-4.

K-H, 1999. Decommissioning Program Plan, June 21, 1999.

MAN-131-QAPM, *Kaiser-Hill Team Quality Assurance Program*, Rev. 1, November 1, 2001.

MAN-076-FDPM, *Facility Disposition Program Manual*, Rev. 3, January 1, 2002.

MAN-077-DDCP, *Decontamination and Decommissioning Characterization Protocol*, Rev. 4, July 15, 20002.

MAN-127-PDSP, *Pre-Demolition Survey Plan for D&D Facilities*, Rev. 1, July 15, 2002.

MARSSIM - Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575, EPA 402-R-97-016).

PRO-475-RSP-16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure,* Rev. 1, May 22, 2001.

PRO-476-RSP-16.02, *Pre-Demolition (Final Status) Radiological Surveys of Surfaces and Structures*, Rev. 1, May 22, 2001.

PRO-477-RSP-16.03, *Radiological Samples of Building Media*, Rev. 1, May 22, 2001.

PRO-478-RSP-16.04, *Radiological Survey/Sample Data Analysis for Final Status Survey*, Rev. 1, May 22, 2001.

PRO-479-RSP-16.05, *Radiological Survey/Sample Quality Control for Final Status Survey*, Rev. 1, May 22, 2001.

PRO-563-ACPR, Asbestos Characterization Procedure, Revision 0, August 24, 1999.

PRO-536-BCPR, Beryllium Characterization Procedure, Revision 0, August 24, 1999.

RFETS, Environmental Waste Compliance Guidance #25, Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition.

RFETS, Environmental Waste Compliance Guidance #27, Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal.

RFCA Standard Operation Protocol for Recycling Concrete, September 28, 1999.

RFETS, Historical Site Assessment Report for Area 2, 991 Cluster, March 2002.

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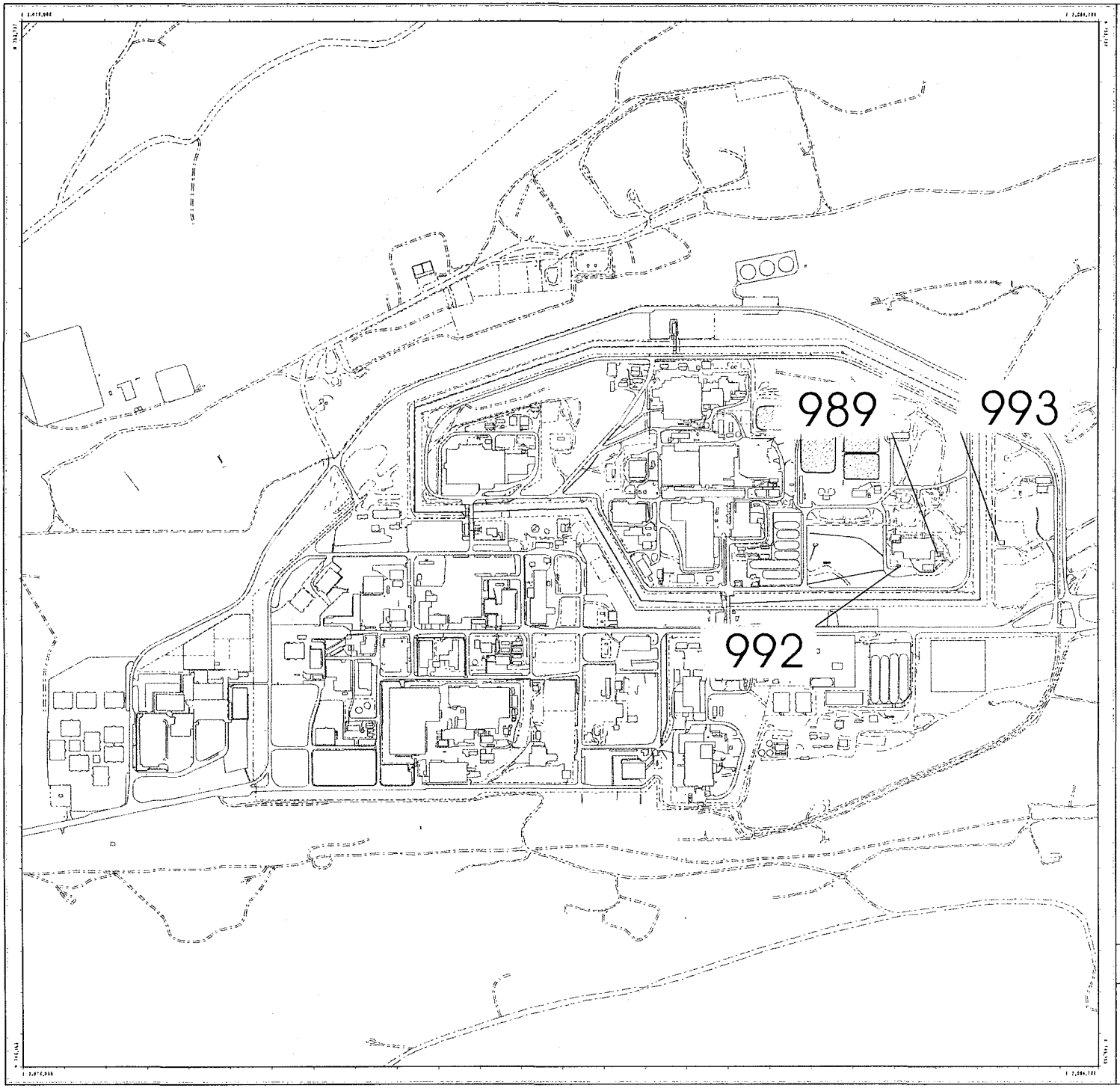
ATTACHMENT A

Facility Location Map



991 Cluster Group 4

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- *Streams, ditches, or other drainage features*
- Fences and other barriers
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1/95

Scale = 1 : 12450
1 inch represents approximately 1038 feet
250 0 500 1000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by:
DynCorp
THE ART OF TECHNOLOGY

Prepared for:
KAISER-HILL COMPANY

MAP ID: FY 2002

April 15, 2002

NT_Svr w:/projects/fy2002/02-0355/Location-991G4.cdr

ATTACHMENT B

Historical Site Assessment Report

ATTACHMENT B

Historical Site Assessment Report

D&D RISS Facility Characterization
Historical Site Assessment Report
May 7, 2002, Rev. 1

Facility ID: Area 2 – Group 2 Building 991 Cluster Type 2 and Type 1 Facilities which includes: Building 991 Product Warehouse, Building 984 Shipping Container Storage Facility, Building 985 Filter Plenum for B996/B997/999, 991TUN Tunnels Between Facilities, Building 992 Guard Post, Building 993 Security Storage Vault, Building 996 Storage Vault for B991, Building 997 Storage Vault for B991, Building 998 Storage Vault for B991, Building 999 Storage Vault for B991, Building 989 Emergency Generator for B991

Anticipated Facility Type (1, 2, or 3): Building 991 Type = 2, Building 984 = Type 1, Building 985 Type = 1, 991TUN = Type 2, Building 992 = Type 1, Building 993 = Type 1, Building 996 Type = 2, Building 997 Type = 2, Building 998 Type = 2, Building 999 Type = 2, Building 989 Type = 1

This facility - specific Historical Site Assessment (HSA) has been performed in accordance with:
D&D Characterization Protocol, RFETS MAN-077-DDCP, latest version, and
Facility Disposition Program Manual, RFETS MAN-076-FDPM, latest version

Physical Description:

Building 991 is listed as the Product Warehouse for RFETS on the Closure Projects Facility List. Building 991 was constructed and put into service in 1952. Building 991 sits on the east side of the Plant, approximately 100 yards north of Central Avenue. Building 991 was constructed in a land depression or natural valley. Building 991 has steel-reinforced poured concrete superstructure. The size of Building 991 is approximately 165 feet wide by approximately 375 feet long which includes the Shipping Dock Area and open covered storage area on the west. Building 991 is approximately 22 feet above ground at the top of the concrete parapet (a low wall or concrete rail/wall above the roof/deck to protect the roof) for the south office and old lab areas. The north part of Building has an additional 14 feet of height which is the high-bay old process area of the building. Building 991 has approximately 37,880 square feet of floor space. Building 991 has a U-shaped Utility Tunnel which provides steam, cooling water, electrical and other utilities to the building. The Building 991 has steel-reinforced poured concrete floors, walls and roof-deck. Many of the Building 991 office hallways and office rooms have Transite® partition walls. Floor tile and carpeting are used in many offices and hallways of Building 991. A section in the Basement Utility Tunnel also has very old floor tiles that probably contain asbestos. The process and storage areas of Building 991 have steel-reinforced poured concrete walls and concrete block walls. The Building 991 east-west high-bay area has 24-inch-steel-reinforced poured concrete walls that support an overhead Crane Rail that was originally used to move heavy objects and/or equipment. The Building 991 concrete roof deck has an additional poured light-weight concrete flat roof with the BUR flat roof design sealed with tar and gravel. The Building 991 East Dock and west covered storage area have a steel roof decks. Including these two roofs Building 991 has seven different roof sections.

The Building 991 utilities at one time included steam, but the Building 991 heating system has been converted to a natural gas re-circulating hot water heating system. Building 991 has electrical power, fluorescent lighting, some sodium and/or mercury vapor lighting exist both inside and outside. Building 991 also has hot and cold running water, LSDW System, Criticality Detector and Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, telephones, Fire Sprinkler and Alarm Systems, and various building utility heating and ventilation control systems.

Building 984 the Shipping Container Storage Facility, also known as the TRU Waste Storage Facility for RFETS, is located directly south of Building 991. Building 984 has a steel I-beam support structure and it is constructed from corrugated metal sandwiched over insulation. Building 984 is constructed on two concrete slabs, as the building was constructed at two different construction phases. The original Building 984 was 24' wide X 30' long X 16' high at the roof eve. The east section or addition section of Building 984 is approximately 40' wide X 75' long X 22' high at the roof eve. The floor space for Building 984 is approximately 3,700 square feet. Both Building 984 sections are supported by steel I-beams. Building 984 was constructed in 1986 and it has approximately 3200 square feet of floor space. Building 984 has a heat-pump heating system, it has electricity for lighting, air exhausters, a Criticality Detector and Alarm System, and a LSDW System.

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Physical Description (Con't):

Building 985 is the Filter Plenum Facility for Buildings 996, 997, and Building 999 within the Building 991 Cluster. Building 985 is approximately 40' wide X 60' long X 17' high at the roof eve. Building 985 contains approximately 2,400 square feet of floor space. Building 985 was constructed in 1974 and is located northwest of Building 991 on the hillside. Building 985 has steel-reinforced concrete superstructure constructed on a steel-reinforced poured concrete slab. In between the concrete vertical support beams, the concrete panels appeared to be pre-poured pre-stressed concrete panels set in place and sealed with concrete, grout, and RTV type sealant. The slab-floor of Building 985 has a tank-pit that is approximately 12 feet deep (below the floor level) on the east side for the plenum firewater deluge-tank. The tank-pit has two pumps, a transfer pump and a sump pump. The exterior wall sections between the concrete vertical support beams are pre-cast pre-stressed concrete wall panels. Building 985 air-lock door entrances are constructed from concrete block. The facility has an exterior air-lock room entrance on the northeast corner and it has an exterior air-lock room entrance on the southeast corner of the facility. Building 985 has a steel-reinforced poured concrete roof/deck. The Building 985 built-up-roof includes a tar-gravel sealed over an aluminum coating, a 4-ply asbestos membrane over sheet 1-5/8' fiberglass insulation on the concrete roof-deck. Building 985 has an exterior Roof Access Ladder, exterior fire hose/firewater hookup, and Building 985 exterior Breathing-Air and communications hookups.

The Building 985 Roof has two roof drains and a parapet wall around the perimeter of the roof. Building 985 has a Criticality Detector/Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, a Fire Sprinkler/Alarm System, and a LSDW System. Building 985's main equipment components include Building Supply Air Filter Plenum FP-602/F-602 which has hot water heating coils, Building Exhaust Filter Plenum FP-601/F-601A/F-601B, along with supply and exhaust fans and motors, and waste holding Tank T-601. Building 985 is not heated, but the plenum air filtration system carries over room temperature air so the building does not get down to freezing temperature. As a freezing pre-caution fire-water and other process water lines are heat-traced to protect them from freezing.

The 991TUN is an underground tunnel between Building 991 and three of the four underground Building 991 Cluster Storage Vault Facilities, Buildings 996, 997 and Building 999. The underground 991 TUN is constructed from all approximately 18-inch thick steel-reinforced poured concrete floors, walls and ceiling/roof. The 991TUN has a 16' square Turn-Around Area at the west end and the walls and tunnel roof have an additional 18-inch thick steel-reinforced poured concrete. The 991TUN is approximately 8' wide X 12'6"' high X 700' long. The 991TUN has approximately 6,000 square feet of underground floor space. The 991TUN areas are equipped with air ventilation from Building 985 and a Criticality Detector/Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, a Fire Sprinkler/Alarm System, and a LSDW System. The walls and ceiling of the 991TUN are painted.

Building 992 is the two-level Guard-Post for the Building 991 Cluster, and it was constructed in 1952. Building 992 is located at the southwest corner of the Building 991 Cluster. Building 992 is a steel-reinforced poured concrete building which includes the Main Floor slab, ceiling, parts of the Second Floor walls and the facility also has a steel-reinforced poured concrete roof deck. The ground floor of Building 992 is approximately 16'6" wide by 16'6"long by 8'10" high. The Main Floor steel-reinforced poured concrete walls extend 4' below grade and are sitting on steel-reinforced poured concrete footings. The Second Floor of Building 992 is octagon-shaped with windows on all sides for 360 degree area vision. Building 992 has 370 square feet of floor space which includes the Second Floor. The Main Floor of Building 992 has a Security Badge Access Port and window on the southeast corner and a Guard Access Door on the northeast corner; the other three wall on the Main Floor each has a large window for Guard viewing in all directions. The Main Floor has a restroom and a stairway access to the Guards Second Floor Observation Room. Building 992 has electricity for lighting, a LSDW System, alarms, and other instrumentation. Building 992 is heated by natural gas. Building 992 has two air conditioning units, a Second Floor exhaust fan, and two exterior mercury-vapor lights.

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Physical Description (Con't):

Building 993 is Security Storage Vault Facility is located approximately 150 yards east of Building 991. Building 993 is a steel framed Butler®-type metal building constructed on a concrete slab. Building 993 has electrical power for lighting and various alarms. Building 993 has two personnel access doors, one on the south end of the west wall corner and one on the east end of the south wall. The south wall also has a large truck access sliding-door, which is now boarded up inside with plywood. Building 993 is approximately 30' wide X 40' long X 15' high at the roof eve and slopes to the north for roof drainage. Building 993 has approximately 1,200 square feet of floor space. The Building 993 roof is also corrugated metal. Building 993 has four exterior mercury-vapor lights for night operations, which is included in the Building 991 Cluster. The floor has a 12 in diameter concrete pit, which was used for explosive bonding testing. In the late 1970s this pit was filled with concrete.

Building 996 is an underground Storage Vault Facility for Building 991 and it is located directly north of Building 991/885. The access tunnel, 991TUN, to Building 996 goes northeast from Building 991 and directly underneath Building 985. Building 996 was constructed in 1952 at the same time Building 991 was built. Buildings 996 and 997 are of identical design whose dimensions are 60' wide X 68' long X 16' high (underground). These two storage vaults have exterior walls of steel-reinforced concrete that are approximately 14' thick and roof/ceilings of steel-reinforced concrete that are 12' thick. The underground footprint of Building 996 is approximately 4,100 square feet, but the underground floor space is approximately 1,400 square feet. The Building 996 is equipped with air ventilation from Building 985 and a Criticality Detector/Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, a Fire Sprinkler/Alarm System, and a LSDW System. The walls, floors and ceiling of Building 996 are painted. Building 996 is partitioned into six different vault-type rooms and each room has a bank-type vault solid-steel door on it.

Building 997 is an underground Storage Vault Facility for Building 991. Building 997 is the underground Storage Vault Facility at the west end of the 991TUN which is approximately 600 feet directly west of Building 996 with Building 999 halfway in between Buildings 997 and 996. Buildings 996 and 997 are of identical design whose dimensions are 60' wide X 68' long X 16' high (underground). These two storage vaults have exterior walls of steel-reinforced concrete that are approximately 14'-thick and roof/ceilings of steel-reinforced concrete that are 12' thick. The underground footprint of Building 997 is approximately 4,100 square feet, but the underground floor space is approximately 1,400 square feet. Building 997 is equipped with air ventilation from Building 985 and a Criticality Detector/Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, a Fire Sprinkler/Alarm System, and a LSDW System. The walls, floors and ceiling of Building 997 are painted. Building 997 is partitioned into six different vault-type rooms and each room has a bank-type vault solid-steel door on it.

Building 998 is an underground Storage Vault Facility for Building 991. Building 998 is located underground, approximately 180' directly north of the northwest corner of Building 991. Building 998 has its own dedicated access tunnel, Corridor A. Building 998, also designated Room 300, is approximately 20' wide X 43'9"' long X 12 feet high and the walls, floor and the roof/ceiling of steel-reinforced concrete that are 4' thick. The underground floor space of Building 998 is approximately 2,640 square feet which includes the 180' long Corridor A, Access Tunnel. Building 998 is equipped with air ventilation from Building 991, a Criticality Detector/Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, a Fire Sprinkler/Alarm System, and a LSDW System. The walls, floors and ceiling of Building 998 are painted.

Building 999 is an underground Storage Vault Facility for Building 991. The facility is located directly northwest of Building 991 and contains approximately 384 square feet of floor space. Building 998, also designated Room 500, is approximately 33' wide X 49' lone X 12 feet high and the walls and floor are 18" thick steel-reinforced concrete; and the roof/ceiling of steel-reinforced concrete that are 4' thick. The underground floor space of Building 999 is approximately 2,000 square feet. Building 999 is equipped with air ventilation from Building 985 and a Criticality Detector/Alarm System, a CAM/SAAM System including Health Physics Air Sampling Vacuum System, a Fire Sprinkler/Alarm System, and a LSDW System. The walls, floors and ceiling of Building 999 are painted. Building 997 is partitioned into four different storage rooms.

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Physical Description (Con't):

Building 989 is the Emergency Facility for the Building 991 Cluster. Building 989 is a single story facility and has steel-reinforced poured concrete floor slab, walls and roof-deck. Building 989 is approximately 16' wide X 24' long X 12' high and it has a steel-reinforced poured concrete floor roof. Building 989 has approximately 384 square feet of floor space. Building 989 has a LSDW System. Building 989 has a single steel entry door on the west and a double steel entry door on the south. Building 989 has an above ground diesel fuel tank and concrete tank-berm on the east side.

Historical Operations:

Building 991 has always been the Product Warehouse for the RFETS. Building 991 was the original final assembly building. Plutonium, enriched uranium, depleted uranium and components from other materials, which would include beryllium, were assembled into final products and stored for off-site shipment. Final assembly operations were in Building 991 were discontinued in 1958 and moved to another building, Building 777. Historically Building 991 also housed nondestructive testing operations, a metallography laboratory, production control operations, and other support operations.
Building 984 has always been the Shipping Container Storage Facility, RCRA Unit 984.1.
Building 985 has always been the Filter Plenum Facility for Underground Storage Vaults, Buildings 996, 997, and Building 999.
The 991TUN facility has always been the access tunnel from Building 991 to Underground Storage Vaults, Buildings 996, 997, and Building 999.
Building 992 has always been the Building 991 Cluster Facilities Guard Post.
Building 993 was a Research and Development Explosive Forming Facility.
Building 996 was always an Underground Vault Facility for Building 991.
Building 997 was always an Underground Vault Facility for Building 991.
Building 998 was always an Underground Vault Facility for Building 991.
Building 999 was always an Underground Vault Facility for Building 991.
Building 989 has always been the Emergency Generator Facility for the Building 991 Cluster Facilities.

Current Operational Status

Building 991 is currently in service as a TRU Waste Drum Storage Facility, a Hazardous Waste Drum Storage Facility, a Permitted Storage Facility and a Receiving and Shipping Storage of all Waste Containers for the RFETS.
Building 984 has always been the Shipping Container Storage Facility, RCRA Unit 984.1 and it is currently in service as a TRU Waste Drum Storage Facility, a Hazardous Waste Drum Storage Facility, a Permitted Storage Facility and a Receiving and Shipping Storage of all Waste Containers for the RFETS.
Building 985 has always been, and currently is in service , the Filter Plenum Facility for Underground Storage Vaults, Buildings 996, 997, and Building 999.
The 991TUN has always been and currently is the access tunnel from Building 991 to Underground Storage Vaults, Buildings 996, 997, and Building 999.
Building 992 is currently Out of Service.
Building 993 is currently in service as a Security Storage Vault for Blank Ammunition.
Building 996 is currently in service as an Underground Vault Facility for Building 991 and it contains 55-gallon waste drums.
Building 997 is currently empty and Out of Service.
Building 998 is currently in service as an Underground Vault Facility for Building 991 and it contains 55-gallon waste drums.
Building 999 is currently empty and Out of Service.
Building 989 has always been the Emergency Generator Facility for the Building 991 Cluster Facilities.

Contaminants of Concern
Asbestos *Describe any potential, likely, or known sources of Asbestos:* All of the Building 991 Facilities might have some asbestos containing materials (ACM) of construction because the facilities were constructed in 1952-1974 time frame except Building 984 which was constructed in 1986. All of the Building 991 Cluster Facilities have partition walls, roof, and pipe insulation might contain asbestos. Although the waste stored in Buildings 991, 996, 998, and 984 may have contained trace amounts of asbestos the waste was not regulated as a TSCA waste. Building 992 (The Guard Post) might have some ACM material of construction in wall, roof, and pipe insulation.
Beryllium (Be) *Describe any potential, likely, or known Be production or storage locations:* Building 991 is on the RFETS Beryllium (Be) Areas Historical and Present list in Rooms 2 (Basement Tunnel), 110, 122, 134,140/140A/141, 122A, Building 991 has other potentially Beryllium contaminated systems, and Building 991 Main Plenum exhausted (historically) beryllium operations to the Building 991 Roof. Building 984 stores Low Level and TRU Wastes drums that are beryllium contaminated. Building 985 contains Plenum 601 for Building 991 that historically exhausted beryllium operations. Building 985 has a potential for beryllium contaminated systems (internally). Building 996 stores Low Level and TRU Wastes drums that are beryllium contaminated. Building 997 historically stored Low Level and TRU Wastes drums that are beryllium contaminated. Building 998 stores Low Level and TRU Wastes drums that are beryllium contaminated. Building 999 historically stored Low Level and TRU Wastes drums that are beryllium contaminated. One interviewee said that at one time beryllium parts, beryllium assemblies, and beryllium testing was conducted throughout Building 991. In addition low-level waste drums/crates containing Be were stored in Building 991. *Summarize any recent Be sampling results:* The Industrial Hygiene Department collects frequent Be samples from may of the facilities in the 991 Cluster. See the Industrial Hygiene Department for a list of resent Be samples collected. No known beryllium contamination exists in the Building 991 Cluster Type 1 Facilities, Buildings 989, 992, and Building 993.
Lead *Describe any potential, likely, or known sources of Lead (e.g., paint, shielding, etc.):* Most of the Building 991Cluster Facilities were constructed in 1952-1974 time frame, therefore it may contain lead-based paints. No lead operations were known to have occurred in Building 991. Historically lead shielding and/or lead-shielded gloveboxes and/or hoods may have been used in Building 991, but currently the facility has no gloveboxes or hoods. All of the other Building 991 Cluster Type 1 and Type 2 Facilities that have paint on them, might have been painted with lead-based paints; this includes 991TUN, Buildings 996, 997, 998, 999, and Building 989.

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RCRA/CERCLA Constituents

Describe any potential, likely, or known sources of RCRA/CERCLA constituents (e.g., chemical storage, waste storage, processes):

Building 991 is currently being used to store drums of hazardous waste some of which contain RCRA/CERCLA constituents. Cleaning chemicals were used and stored in Building 991. Building 991 has a WSRIC. Building 984 is listed on "The Master List of RCRA Units".

Building 991 has Room 170 listed on "The Master List of RCRA Units" as a Permitted Area, Unit 991.1.

Building 984 is a Permitted Storage Area, Unit 984.1

Building 993 has a "Special Material Storage" area listed on "The Master List of RCRA Units" as a Permitted Area, Unit 993.1. Dynamite was used in the explosive forming testing performed in the pit in the floor of this building. The pit was filled with water during this testing, which sometimes used depleted uranium alloys.

Building 996 has "Container Storage, 996 Vault", never used for hazardous waste and not subject to RCRA regulation, Unit 90.128.

Describe any potential, likely, or known spill locations (and sources, if any):

Small volume spills of solvents, acids and other RCRA/CERCLA constituents likely occurred, but no large volume chemical spills have been documented in any of the Building 991 Cluster facilities. See this environmental Concerns section below for additional release information documented in IHSSs, PACs, and UBCs.

Describe methods in which spills were mitigated, if any:

Unknown

PCBs

Describe any potential, likely, or known sources of PCBs (e.g., light ballasts, paints, equipment, etc.):

Buildings 991, 985, 992, 993, 996, 997, 998, and Building 999 may contain PCB/lead-based paints. Building 991 Cluster Type 1 and Type 2 Facilities have lighting ballasts that might contain PCBs. No known equipment containing PCBs, were ever located in Building 991. The Building 991 Cluster, exterior power transformers, Transformers 991-1 and 991-2, have been known to contain PCBs These transformer have been documented in PAC 900-1306, "Transformers 991-1 and 991-2" and was recommended for NFA in the 1996 HRR Annual Update.

Describe any potential, likely, or known spill locations (and sources, if any):

Building 991 Cluster, exterior power transformers, Transformers 991-1 and 991-2 historically leaked at least on one occasion.

Describe methods in which spills were mitigated, if any:

Unknown

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Radiological Contaminants

Describe any potential, likely, or known radiological production or storage locations:

Building 991 has radiological contaminated drums stored in most rooms is the back area, behind the locked entry doors. Building 984 stores low-level contaminated waste drums and low-level contaminated waste crates from Building 991 and the U/Pu contaminated buildings at RFETS until shipments can be made out of the facility. Buildings 991 and 984 are currently posted as a RMA. The pit in the floor slab (which was filled with water during the testing) of Building 993 was used to test the forming of flat pieces of various metal. Depleted uranium alloys were sometimes used in these tests, there is no known building contamination resulting from these tests.

Describe any potential, likely, or known spill locations (e.g., known leaking sealed radioactive sources, leaking waste drums, potentially contaminated drains, etc.):

Small volume spills and occasional cross-contamination form the exterior of the waste containers stored in these building may have occurred, but no large volume spills have been documented in any of the Building 991 Cluster facilities. See the Environmental Concerns section for additional release information related to IHSSs, PACs and UBCs.

Describe methods in which spills were mitigated, if any:

Spills were cleaned up to the standards of the day.

Describe any potential, likely, or known isotopes of concern (e.g., weapons grade plutonium, uranium isotopes, pure beta emitters, mixed fission products, etc.): Isotopes of concern include but are not limited to plutonium, enriched uranium, and depleted uranium. No pure beta emitters or mixed fission products are not known to have been handled in any of the facilities addressed in this HSA. Building 991 has several sealed radioactive sources that are stored and routinely used in the facility. These sealed sources are stored in five different locations in Building 991. The sealed radioactive sources include Pu-238, Pu-239, Cf-252, Cs-137, Sr-90, Ir-192, and Eu-152. None of the sealed sources were known to have leaked.

Describe any potential, likely, or known external facility contamination (e.g., stack release points, unfiltered ventilation, facility's physical location to known site releases, etc.):

See "Environmental Restoration Concerns" section below.

Environmental Restoration Concerns

Describe any ER concerns that could affect facility characterization (e.g., IHSSs, PACs, UBCs):

Building 991 has UBC-991 which includes Buildings 991, 996, 997, 998, and Building 999 that historically had a lot of different materials and components stored and assembled in them.

Building 991/992 has PAC 900-184, a Steam Cleaning Area for radioactively-contaminated equipment and drums, that is an area of concern.

Building 991 has PAC 900-173 South Dock Area, Building 991 and the associated Buildings 996, 997, 998, and 999, incidents involving very small quantities of plutonium, uranium, and beryllium. Small spills likely occurred in these areas and small parts and equipment were washed in the Building 991 dock area.

Building 991 has PAC 900-1301, enclosed 50 feet wide along the south side of storage of various radioactive contaminated waste and materials is an area of concern.

Building 991 has PAC 900-1302, Gasoline Spill, NFA Recommendation approved by EPA, 1992[4].

Building 991 has PAC 900-1303, Natural Gas Leak, NFA Recommendation approved by EPA, 1992[4].

Building 991 has PAC 900-1304, Chromic Acid Spill, NFA Recommendation approved by EPA, 1992[4].

Building 991 has PAC 900-1305, Building 991 Roof, NFA Recommendation approved by EPA, 1992[4].

Building 991 has PAC 900-1306, Transformers 991-1 and 991-2, Recommended for NFA in 1996 HRR Annual Update.

Building 993 has PAC 900-1307 because of an Explosive Forming/Bonding Pit experiments. These experiments involve the use of dynamite to bond depleted uranium alloys with stainless steel.

Additional Information

Describe any additional information that may be useful during facility characterization (e.g., contaminant migration routes, waste handling operations, physical hazards, Historical Release Reports, WSRIC data, etc.):

The Building 991 Cluster has several PACs that are listed in the RFETS Historical Release Reports. Buildings 991and 985 both have a WSRIC.

References

Provide all sources of information utilized to gather data for facility history (e.g., documents, files, interviews). Attach all applicable supporting documentation.

Sources reviewed to complete this HSA were the RFETS Facility list, the Historical Release Report, the Listing of Beryllium Areas Historical and Present, Site Master List of RCRA Units, and the Site IHSS, PAC, and UBC databases. Building 991 has a Facility Safety Analysis Report (FSAR). Building 991and Building 985 both have a WSRIC. In addition, a facility walkdown of all Building 991 Cluster Facilities was performed. The Configuration Control Authority for Building 991was interviewed for Type 1 Facilities and Type 2 Facilities and he was very familiar with every one of them as to current configuration and use, but he knew very little about historical operations.

Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 991, Type 2

Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
83,320	500	6,000	2,500	3,500	TBD	1,800 Transite® cu ft wall panels 12,000 cu ft BUR, (possibly ACM) 500 cu ft floor tile, (possibly ACM) 2,000 cu ft ceiling tile, (possibly ACM) 2,500 cu ft pipe insulation (possibly ACM)

Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 984, Type 1

Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
14,500	None	2,600	7,500	None	TBD	5,000 Cu ft wall/roof insulation

Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 985, Type 1

Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)

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18,000	None	980	None	None	TBD	900 cu ft pipe Insulation 400 cu ft fiberglass insul. 600 cu ft asbestos membrane roofing material
Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 989, Type 1						
Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
3,200	None	240	None	None	TBD	60 cu ft pipe insulation
Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, 991TUN, Type 2						
Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
37,000	None	2,500	None	None	TBD	None
Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 992, Type 1						
Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
2,500	None	1,200	None	300	TBD	400 cu ft window Glass 4 cu ft Mercury Vapor Lights 60 cu ft pipe insulation 200 cu ft wall/ceiling insul
Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 993, Type 1						
Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
5,000	30	800	3,500	None	TBD	30 cu ft window Glass 4 cu ft Mercury Vapor Lights
Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 996, Type 2						
Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
55,000	600	120	None	None	TBD	None

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Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991Cluster, Building 997, Type 1

Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
55,000	600	120	None	None	TBD	None

Further Actions

Recommend any further actions, if any (e.g., characterization, decontamination, special handling, etc.):

Begin the RLC/PDS process.

Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991 Facilities, Building 998, Type 2

Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
31,200	None	20	None	None	TBD	None

Waste Volume Estimates and Material Types For Area 2 – Group 2, Building 991Cluster, Building 999, Type 1

Concrete (cu ft)	Wood (cu ft)	Metal (cu ft)	Corrugated Sheet Metal (cu ft)	Wall Board (cu ft)	ACM	Other Waste (cu ft)
28,800	None	20	None	None	TBD	None

Further Actions

Recommend any further actions, if any (e.g., characterization, decontamination, special handling, etc.):

Begin the RLC/PDS process.

Note:

This HSA was performed prior to SME walkdowns, and chemical and radiological characterization package preparations. SMEs should evaluate and/or verify all information during the RLC/PDS process. SMEs may need to review additional documentation and perform additional interviews. Information contained in this HSA Report only represents a "snapshot" in time. Subsequent data may be obtained during SME walkdowns and chemical and radiological characterization package preparations, which may conflict with this report. However, this HSA Report will not be amended. The RLC data will take precedence over the information in this HSA Report. RLC data will appear in the RLCR/PDSR.

Prepared By: Bob Sheets (Name) — Signature: Doug Bryant For Bob Sheets — Date: 5-7-02

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ATTACHMENT C

Radiological Data Summaries and Survey Maps

SURVEY UNIT 991-A-002
RADIOLOGICAL DATA SUMMARY - PDS

Survey Unit Description: B989 (Interior)

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Total Surface Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-10.6		dpm/100 cm^2
MAX	39.3		dpm/100 cm^2
MEAN	7.6		dpm/100 cm^2
STD DEV	15.7		dpm/100 cm^2
TRANSURANIC DCGL$_W$	100		dpm/100 cm^2

Removable Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-0.3		dpm/100 cm^2
MAX	2.9		dpm/100 cm^2
MEAN	0.7		dpm/100 cm^2
STD DEV	1.0		dpm/100 cm^2
TRANSURANIC DCGL$_W$	20		dpm/100 cm^2

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SURVEY UNIT 991-A-002
TSA - DATA SUMMARY

Manufacturer:	NE Electra	NE Electra
Model:	DP-6	DP-6
Instrument ID#:	7	8
Serial #:	394	1379
Cal Due Date:	1/12/03	11/20/02
Analysis Date:	7/30/02	7/30/02
Alpha Eff. (c/d):	0.226	0.173
Alpha Bkgd (cpm)	2.7	2.0
Sample Time (min)	1.5	1.5
LAB Time (min)	1.5	1.5
MDC (dpm/100cm^2)	48.0	48.0

Sample Location Number	Instrument ID#:	Sample Gross Counts (cpm)	Sample Gross Activity (dpm/100cm2)	LAB Gross Counts (cpm)	LAB Gross Activity (dpm/100cm2)	Sample Net Activity (dpm/100cm2)[1]
1	7	4.0	17.7	5.3	23.5	-4.8
2	7	6.0	26.5	2.7	11.9	4.0
3	7	4.7	20.8	1.3	5.8	-1.7
4	8	6.0	34.7	3.3	19.1	12.2
5	8	2.7	15.6	5.3	30.6	-6.9
6	8	6.7	38.7	8.7	50.3	16.2
7	8	7.3	42.2	6.7	38.7	19.7
8	8	10.7	61.8	5.3	30.6	39.3
9	7	2.7	11.9	1.3	5.8	-10.6
10	7	7.3	32.3	4.0	17.7	9.8
11	8	4.7	27.2	4.3	24.9	4.6
12	7	2.7	11.9	4.0	17.7	-10.6
13	8	10.0	57.8	5.3	30.6	35.3
14	7	3.3	14.6	3.3	14.6	-7.9
15	8	6.7	38.7	2.8	16.2	16.2
					22.5	Sample LAB Average
					MIN	-10.6
					MAX	39.3
					MEAN	7.6
					SD	15.7
					Transuranic DCGL$_W$	100

1 - Average LAB used to subtract from Gross Sample Activity

QC Measurements

8 QC	7	8.7	38.5	2.7	11.9	19.2
15QC	7	6.7	29.6	6.0	26.5	10.4
					19.2	QC LAB Average
					Transuranic DCGL$_W$	100

1 - Average QC LAB used to subtract from Gross Sample Activity

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SURVEY UNIT 991-A-002
RSC - DATA SUMMARY

Manufacturer:	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4
Instrument ID#:	1	2	3	4
Serial #:	824	851	963	**966**
Cal Due Date:	10/1/02	10/29/02	1/3/03	**11/6/02**
Analysis Date:	7/30/02	7/30/02	7/30/02	**7/30/02**
Alpha Eff. (c/d):	0.33	0.33	0.33	**0.33**
Alpha Bkgd (cpm)	0.0	0.0	0.2	**0.1**
Sample Time (min)	2	2	2	**2**
Bkgd Time (min)	10	10	10	**10**
MDC (dpm/100cm^2)	9.0	9.0	9.0	**9.0**

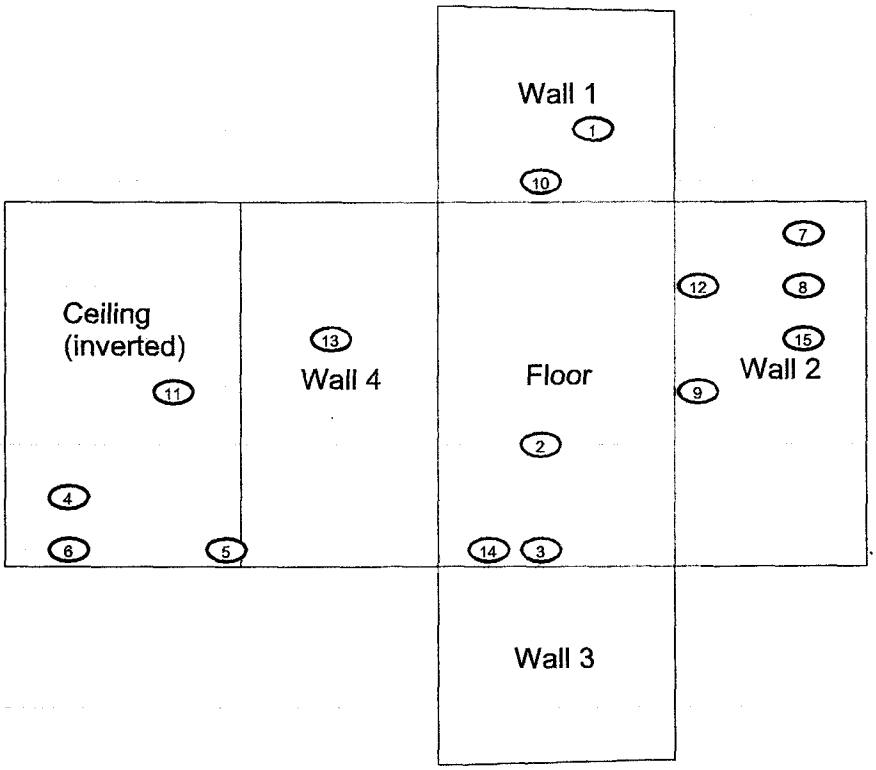
Sample Location Number	Instrument ID#	Gross Counts (cpm)	Net Activity (dpm/100 cm^2)
1	1	1.0	1.5
2	2	1.0	1.5
3	3	1.0	1.2
4	4	0.0	-0.2
5	1	0.0	0.0
6	2	0.0	0.0
7	3	0.0	-0.3
8	4	2.0	2.9
9	1	0.0	0.0
10	2	0.0	0.0
11	3	0.0	-0.3
12	4	0.0	-0.2
13	1	1.0	1.5
14	2	1.0	1.5
15	3	1.0	1.2
		MIN	-0.3
		MAX	2.9
		MEAN	0.7
		SD	1.0
		Transuranic DCGL$_W$	**20**

32

PRE-DEMOLITION SURVEY FOR 991 CLUSTER

Survey Area: A **Survey Unit: 991-A-002** **Classification: 3**
Building: 989
Survey Unit Description: Interior of Building
Total Area: 147 sq. m. **Total Floor Area: 31 sq. m.**

B989



Scan Area

SURVEY MAP LEGEND

- (#) Smear & TSA Location
- (#) Smear, TSA & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15
0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

Scan Survey Information
Survey Instrument ID #(s): 7, 8
RCT ID #(s): 1, 2

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707

DynCorp
THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL

MAP ID: 02-355/989-IN-SC

August 7, 2002

53

SURVEY UNIT 991-A-003
RADIOLOGICAL DATA SUMMARY - PDS

Survey Unit Description: B992 (Interior)

Total Surface Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-16.6		dpm/100 cm^2
MAX	62.7		dpm/100 cm^2
MEAN	7.0		dpm/100 cm^2
STD DEV	18.4		dpm/100 cm^2
TRANSURANIC DCGL$_W$	100		dpm/100 cm^2

Removable Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-0.3		dpm/100 cm^2
MAX	3.0		dpm/100 cm^2
MEAN	0.5		dpm/100 cm^2
STD DEV	1.0		dpm/100 cm^2
TRANSURANIC DCGL$_W$	20		dpm/100 cm^2

35

SURVEY UNIT 991-A-003
TSA - DATA SUMMARY

Manufacturer:	NE Electra	NE Electra
Model:	DP-6	DP-6
Instrument ID#:	7	8
Serial #:	1379	394
Cal Due Date:	11/20/02	1/12/03
Analysis Date:	7/26/02	7/26/02
Alpha Eff. (c/d):	0.173	0.226
Alpha Bkgd (cpm)	5.0	2.0
Sample Time (min)	1.5	1.5
LAB Time (min)	1.5	1.5
MDC (dpm/100cm^2)	48.0	48.0

Sample Location Number	Instrument ID#:	Sample Gross Counts (cpm)	Sample Gross Activity (dpm/100cm2)	LAB Gross Counts (cpm)	LAB Gross Activity (dpm/100cm2)	Sample Net Activity (dpm/100cm2)[1]
1	7	4.0	23.1	4.7	27.2	0.8
2	8	2.7	11.9	1.3	5.8	-10.4
3	7	5.3	30.6	4.7	27.2	8.3
4	8	8.7	38.5	6.0	26.5	16.2
5	8	3.3	14.6	2.0	8.8	-7.7
6	7	3.3	19.1	2.0	11.6	-3.2
7	7	6.7	38.7	4.0	23.1	16.4
8	8	5.3	23.5	5.3	23.5	1.1
9	7	4.7	27.2	6.0	34.7	4.9
10	8	8.0	35.4	4.7	20.8	13.1
11	7	14.7	85.0	11.3	65.3	62.7
12	8	6.0	26.5	6.7	29.6	4.2
13	8	1.3	5.8	0.7	3.1	-16.6
14	7	6.7	38.7	2.7	15.6	16.4
15	8	4.7	20.8	2.7	11.9	-1.5

1 - Average LAB used to subtract from Gross Sample Activity

22.3	Sample LAB Average
MIN	-16.6
MAX	62.7
MEAN	7.0
SD	18.4
Transuranic DCGL$_W$	100

QC Measurements

13 QC	7	3.3	19.1	2.0	11.6	3.8
15QC	7	6.0	34.7	3.3	19.1	19.4

1 - Average QC LAB used to subtract from Gross Sample Activity

15.3	QC LAB Average
Transuranic DCGL$_W$	100

36

SURVEY UNIT 991-A-003
RSC - DATA SUMMARY

Manufacturer:	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4
Instrument ID#:	1	2	3	4
Serial #:	824	851	963	966
Cal Due Date:	10/1/02	10/29/02	1/3/03	11/6/02
Analysis Date:	7/30/02	7/30/02	7/30/02	7/30/02
Alpha Eff. (c/d):	0.33	0.33	0.33	0.33
Alpha Bkgd (cpm)	0.0	0.0	0.2	0.1
Sample Time (min)	2	2	2	2
Bkgd Time (min)	10	10	10	10
MDC (dpm/100cm^2)	9.0	9.0	9.0	9.0

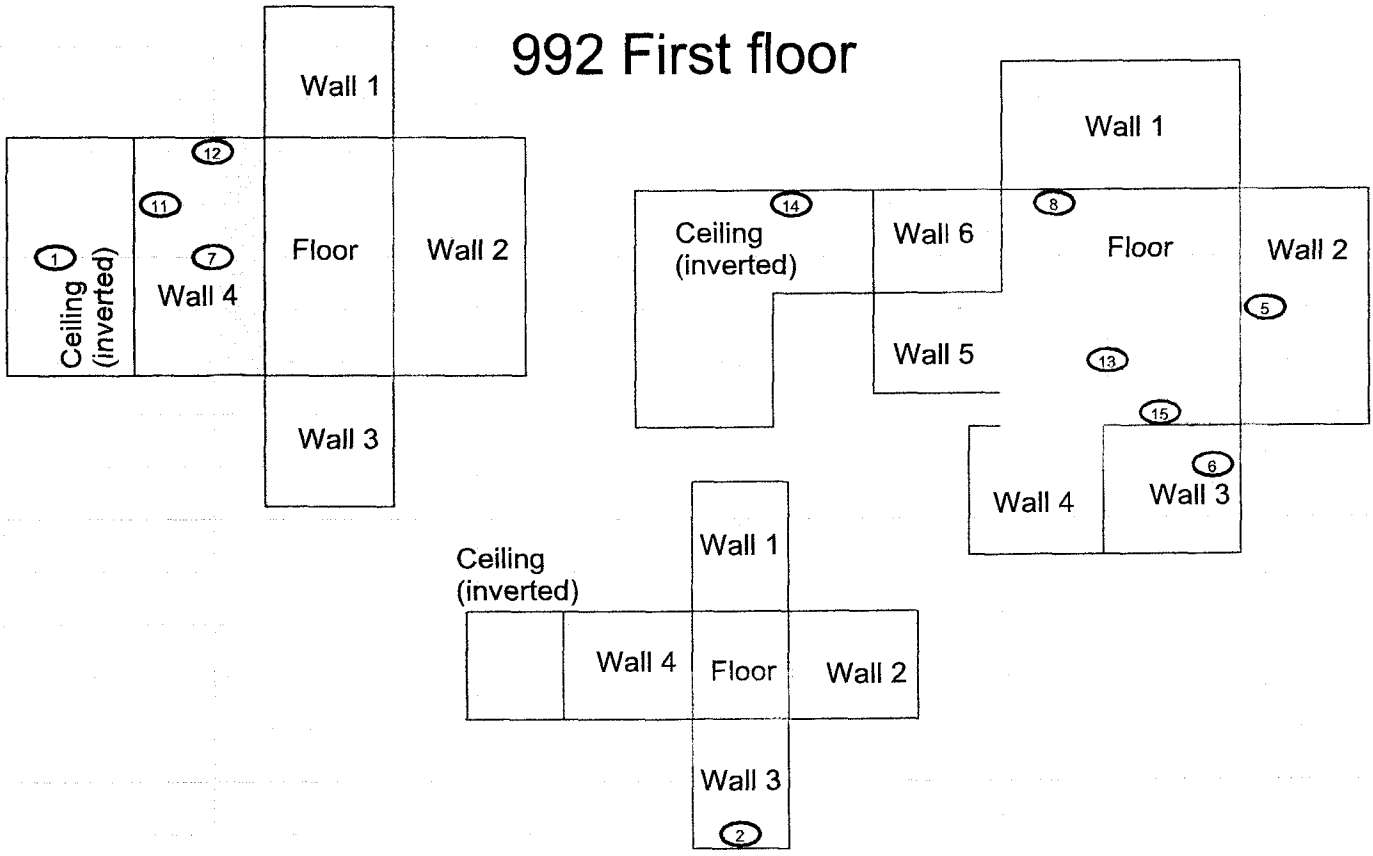
Sample Location Number	Instrument ID#	Gross Counts (cpm)	Net Activity (dpm/100 cm^2)
1	1	0.0	0.0
2	2	2.0	3.0
3	3	0.0	-0.3
4	4	0.0	-0.2
5	1	1.0	1.5
6	2	0.0	0.0
7	3	0.0	-0.3
8	4	0.0	-0.2
9	1	0.0	0.0
10	2	1.0	1.5
11	3	0.0	-0.3
12	4	0.0	-0.2
13	1	1.0	1.5
14	2	1.0	1.5
15	3	0.0	-0.3
		MIN	-0.3
		MAX	3.0
		MEAN	0.5
		SD	1.0
		Transuranic DCGL$_W$	20

37

PRE-DEMOLITION SURVEY FOR 991 CLUSTER

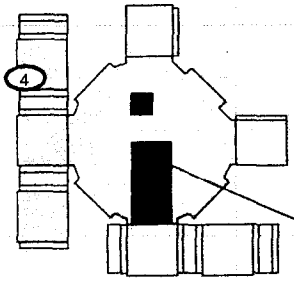
Survey Area: A **Survey Unit: 991-A-003** **Classification: 3**
Building: 992
Survey Unit Description: Interior of Building
Total Area: 203 sq. m. **Total Floor Area: 38 sq. m.**

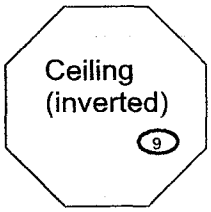
992 First floor

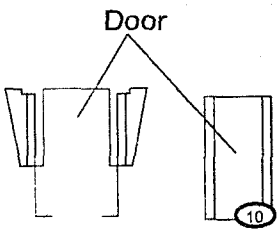


992 Second floor

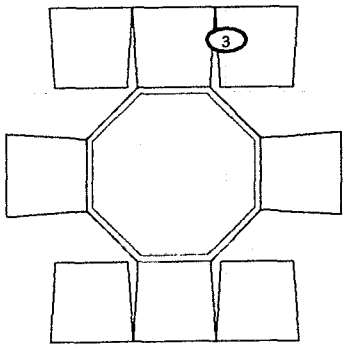
Floor and lower walls







Shelf and upper windows



Scan Area

SURVEY MAP LEGEND
- Smear & TSA Location
- Smear, TSA & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15
0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

Scan Survey Information
Survey Instrument ID #(s): 7, 8, 9
RCT ID #(s): 1, 2, 4

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707 Prepared for:

DynCorp
THE ART OF TECHNOLOGY

KAISER-HILL

MAP ID: 02-0355/992-IN-SC July 31, 2002

SURVEY UNIT 991-A-004
RADIOLOGICAL DATA SUMMARY - PDS

Survey Unit Description: B993 (Interior)

39

Total Surface Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-8.6		dpm/100 cm^2
MAX	28.9		dpm/100 cm^2
MEAN	8.6		dpm/100 cm^2
STD DEV	11.8		dpm/100 cm^2
TRANSURANIC $DCGL_W$	100		dpm/100 cm^2

Removable Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-0.3		dpm/100 cm^2
MAX	4.5		dpm/100 cm^2
MEAN	0.5		dpm/100 cm^2
STD DEV	1.3		dpm/100 cm^2
TRANSURANIC $DCGL_W$	20		dpm/100 cm^2

SURVEY UNIT 991-A-004
TSA - DATA SUMMARY

Manufacturer:	NE Electra	NE Electra	NE Electra
Model:	DP-6	DP-6	DP-6
Instrument ID#:	7	8	9
Serial #:	1250	1271	1366
Cal Due Date:	10/10/02	2/1/03	2/1/03
Analysis Date:	8/7/02	8/7/02	8/7/02
Alpha Eff. (c/d):	0.213	0.211	0.204
Alpha Bkgd (cpm)	0.0	2.0	3.0
Sample Time (min)	1.5	1.5	1.5
LAB Time (min)	1.5	1.5	1.5
MDC (dpm/100cm^2)	48.0	48.0	48.0

Sample Location Number	Instrument ID#:	Sample Gross Counts (cpm)	Sample Gross Activity (dpm/100cm2)	LAB Gross Counts (cpm)	LAB Gross Activity (dpm/100cm2)	Sample Net Activity (dpm/100cm2)[1]
1	7	4.0	18.8	0.7	3.3	4.1
2	8	8.0	37.9	7.3	34.6	23.2
3	7	3.3	15.5	3.3	15.5	0.8
4	7	4.0	18.8	4.0	18.8	4.1
5	7	9.3	43.7	2.0	9.4	28.9
6	8	2.7	12.8	1.3	6.2	-1.9
7	8	7.3	34.6	2.7	12.8	19.9
8	8	5.3	25.1	7.3	34.6	10.4
9	7	6.0	28.2	1.3	6.1	13.4
10	7	2.0	9.4	1.3	6.1	-5.3
11	8	3.3	15.6	3.3	15.6	0.9
12	7	3.3	15.5	0.7	3.3	0.8
13	9	5.3	26.0	4.0	19.6	11.3
14	7	1.3	6.1	2.7	12.7	-8.6
15	8	8.7	41.2	4.7	22.3	26.5

1 - Average LAB used to subtract from Gross Sample Activity

14.7	Sample LAB Average
MIN	-8.6
MAX	28.9
MEAN	8.6
SD	11.8
Transuranic DCGL$_W$	100

QC Measurements

5QC	9	4.7	23.0	3.3	16.2	-1.5
8QC	9	4.7	23.0	6.7	32.8	-1.5

1 - Average QC LAB used to subtract from Gross Sample Activity

24.5	QC LAB Average
Transuranic DCGL$_W$	100

91

SURVEY UNIT 991-A-004
RSC - DATA SUMMARY

Manufacturer:	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4
Instrument ID#:	1	2	3	4
Serial #:	824	851	963	**966**
Cal Due Date:	10/1/02	10/29/02	1/3/03	**11/6/02**
Analysis Date:	8/8/02	8/8/02	8/8/02	**8/8/02**
Alpha Eff. (c/d):	0.33	0.33	0.33	**0.33**
Alpha Bkgd (cpm)	0.0	0.0	0.2	**0.1**
Sample Time (min)	2	2	2	**2**
Bkgd Time (min)	10	10	10	**10**
MDC (dpm/100cm^2)	9.0	9.0	9.0	**9.0**

Sample Location Number	Instrument ID#	Gross Counts (cpm)	Net Activity (dpm/100 cm^2)
1	1	1.0	1.5
2	2	1.0	1.5
3	3	0.0	-0.3
4	4	0.0	-0.2
5	1	0.0	0.0
6	2	0.0	0.0
7	3	0.0	-0.3
8	4	0.0	-0.2
9	1	0.0	0.0
10	2	1.0	1.5
11	3	0.0	-0.3
12	4	0.0	-0.2
13	1	3.0	4.5
14	2	0.0	0.0
15	3	0.0	-0.3
		MIN	-0.3
		MAX	4.5
		MEAN	0.5
		SD	1.3
		Transuranic DCGL$_W$	**20**

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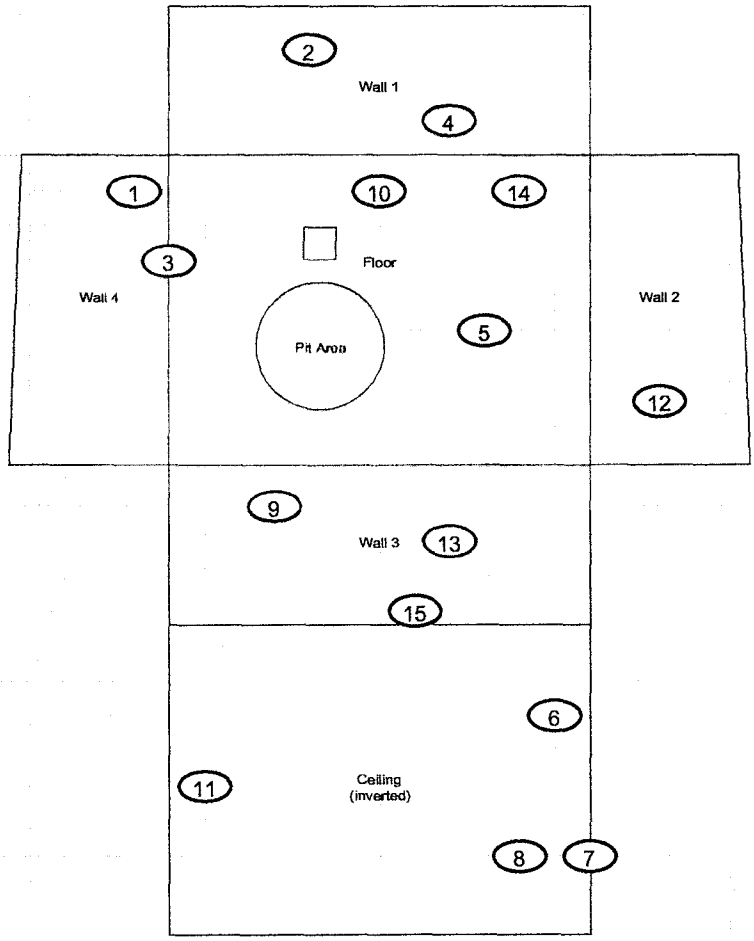
PRE-DEMOLITION SURVEY FOR 991 CLUSTER

Survey Area: A **Survey Unit: 991-A-004** **Classification: 3**
Building: 993
Survey Unit Description: Interior of Buildng
Total Area: 396 sq. m. **Total Floor Area: 106 sq. m.**

Building 993



Scan Area

SURVEY MAP LEGEND
- Smear & TSA Location
- Smear, TSA & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 25
0 METERS 8

1 inch = 18 feet 1 grid sq. = 1 sq. m.

Scan Survey Information
Survey Instrument ID #(s): 8
RCT ID #(s): 4

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707

DynCorp
THE ART OF TECHNOLOGY

Prepared for:
KAISER HILL

MAP ID: 02-0355/B993-IN-SC **August 12, 2002**

SURVEY UNIT 991-B-006
RADIOLOGICAL DATA SUMMARY - PDS

Survey Unit Description: B989 (Exterior)

Total Surface Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-5.7		dpm/100 cm^2
MAX	116.2		dpm/100 cm^2
MEAN	32.4		dpm/100 cm^2
STD DEV	28.2		dpm/100 cm^2
TRANSURANIC DCGL$_W$	100		dpm/100 cm^2

Removable Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-0.3		dpm/100 cm^2
MAX	6.1		dpm/100 cm^2
MEAN	0.9		dpm/100 cm^2
STD DEV	1.7		dpm/100 cm^2
TRANSURANIC DCGL$_W$	20		dpm/100 cm^2

Location 13 (metal flashing) had initial alpha activity greater than the transuranic DCGL$_W$ (100dpm/100cm^2). A coupon sample was collected and analyzed using the Canberra ISOCS gamma spectroscopy system. Gamma spectroscopy results indicated only uranium contamination and other naturally occuring isotopes. No DOE-added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore no further investigation is required and all data meets the PDSP unrestricted release criteria.

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SURVEY UNIT 991-B-006
TSA - DATA SUMMARY

Manufacturer:	NE Electra	NE Electra	NE Electra	NE Electra
Model:	DP-6	DP-6	DP-6	DP-6
Instrument ID#:	8	9	10	11
Serial #:	1379	1250	394	1271
Cal Due Date:	11/20/02	10/10/02	1/12/03	2/1/03
Analysis Date:	7/29/02	7/29/02	7/29/02	7/29/02
Alpha Eff. (c/d):	0.173	0.213	0.226	0.211
Alpha Bkgd (cpm)	1.3	1.3	4.0	2.0
Sample Time (min)	1.5	1.5	1.5	1.5
LAB Time (min)	1.5	1.5	1.5	1.5
MDC (dpm/100cm^2)	48.0	48.0	48.0	48.0

Sample Location Number	Instrument ID#:	Sample Gross Counts (cpm)	Sample Gross Activity (dpm/100cm2)	LAB Gross Counts (cpm)	LAB Gross Activity (dpm/100cm2)	Sample Net Activity (dpm/100cm2)[1]
1	10	12.7	56.2	4.7	20.8	41.2
2	10	10.0	44.2	2.0	8.8	29.2
3	10	6.7	29.6	1.3	5.8	14.6
4	10	8.7	38.5	3.3	14.6	23.5
5	8	9.3	53.8	5.3	30.6	38.7
6	8	5.3	30.6	4.0	23.1	15.6
7	10	9.3	41.2	1.3	5.8	26.1
8	8	11.3	65.3	6.0	34.7	50.3
9	10	8.0	35.4	2.0	8.8	20.4
10	9	2.0	9.4	2.7	12.7	-5.7
11	10	7.3	32.3	4.0	17.7	17.3
12	10	4.7	20.8	0.0	0.0	5.8
13*	8	22.7	131.2	4.0	23.1	116.2
14	8	10.7	61.8	1.3	7.5	46.8
15	8	10.7	61.8	2.0	11.6	46.8
					15.0	Sample LAB Average
					MIN	-5.7
					MAX	116.2
					MEAN	32.4
					SD	28.2
					Transuranic DCGL$_W$	**100**

1 - Average LAB used to subtract from Gross Sample Activity

* - Location 13 (metal flashing) had initial alpha activity greater than the transuranic DCGL$_W$ (100dpm/100cm^2). A coupon sample was collected and analyzed using the Canberra ISOCS gamma spectroscopy system. Gamma spectroscopy results indicated only uranium contamination and other naturally occuring isotopes. No DOE-added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore no further investigation is required and all data meets the PDSP unrestricted release criteria.

QC Measurements

4QC	9	4.0	18.8	5.3	24.9	-7.7
7QC	9	4.0	18.8	6.0	28.2	-7.7
					26.5	QC LAB Average
					Transuranic DCGL$_W$	**100**

1 - Average QC LAB used to subtract from Gross Sample Activity

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SURVEY UNIT 991-B-006
RSC - DATA SUMMARY

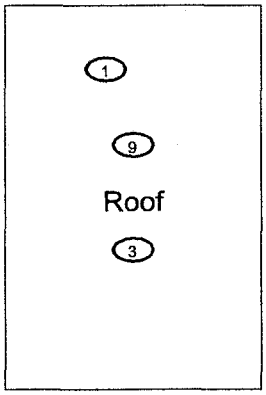
Manufacturer:	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4
Instrument ID#:	1	2	3	4
Serial #:	824	851	963	**966**
Cal Due Date:	10/1/02	10/29/02	1/3/03	**11/6/02**
Analysis Date:	7/29/02	7/29/02	7/29/02	**7/29/02**
Alpha Eff. (c/d):	0.33	0.33	0.33	**0.33**
Alpha Bkgd (cpm)	0.0	0.0	0.2	**0.1**
Sample Time (min)	2	2	2	**2**
Bkgd Time (min)	10	10	10	**10**
MDC (dpm/100cm^2)	9.0	9.0	9.0	**9.0**

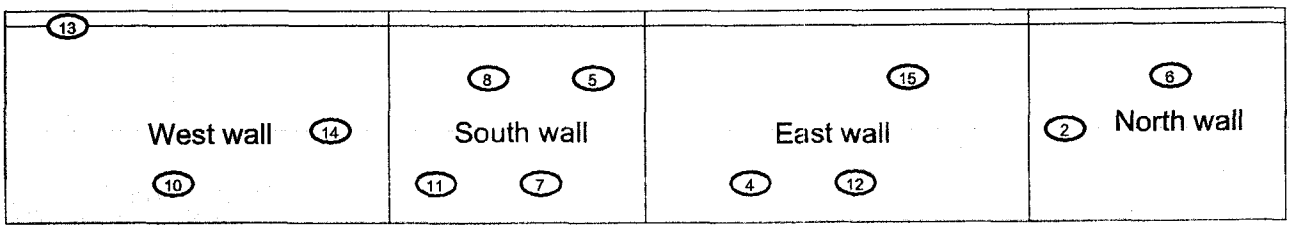
Sample Location Number	Instrument ID#	Gross Counts (cpm)	Net Activity (dpm/100 cm^2)
1	2	**0**	0.0
2	1	0	0.0
3	1	1	1.5
4	3	0	-0.3
5	2	0	0.0
6	2	1	1.5
7	1	2	3.0
8	4	0	-0.2
9	3	0	-0.3
10	2	4	6.1
11	4	0	-0.2
12	4	0	-0.2
13	1	1	1.5
14	3	0	-0.3
15	3	1	1.2
		MIN	-0.3
		MAX	6.1
		MEAN	0.9
		SD	1.7
		Transuranic DCGL$_W$	**20**

PRE-DEMOLITION SURVEY FOR 991 CLUSTER

Survey Area: B **Survey Unit: 991-B-006** **Classification: 3**
Building: 989
Survey Unit Description: Exterior of Building
Total Area: 134 sq. m. **Total Roof Area: 36 sq. m.**

B989





Scan Area

SURVEY MAP LEGEND

- Smear & TSA Location
- Smear, TSA & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15
0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

Scan Survey Information
Survey Instrument ID #(s): 8,10
RCT ID #(s): 2, 3

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707

DynCorp
THE ART OF TECHNOLOGY

Prepared for: KAISER HILL

MAP ID: 02-0355/B989-EX-SC August 12, 2002

SURVEY UNIT 991-B-006
CANBERRA GAMMA SPECTROSCOPY RESULTS

Survey Unit Description: B989 (Exterior)

49

CANBERRA

Analysis Results Header 8/15/2002 11:00:36 AM Page 1

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**************************************************************************
*****      G A M M A   S P E C T R U M   A N A L Y S I S          *****
** C a n b e r r a  M o b i l e  L a b o r a t o r y  S e r v i c e s **
**************************************************************************
```

Report Generated On : 8/15/2002 11:00:36 AM

RIN Number : 02S0210
Analytical Batch ID : 0208124732
Line Item Code : RC10B019

Filename: A:\G1900052.CNF

Sample Number : 02S0210-019.001
Lab Sample Number : CMLS-1593
Sample Receipt Date : 8/12/2002
Sample Volume Received : 2.23E+001 Grams

Result Identifier : N/A

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 100 - 8192
Peak Area Range (in channels) : 100 - 8192
Identification Energy Tolerance : 1.000 keV

Sample (Final Aliquot Size) : 2.234E+001 Grams
Sample Quantity Error : 0.000E+000
Systematic Error Applied : 0.000E+000

Sample Taken On : 8/09/2002 2:45:00 PM
Acquisition Started : 8/13/2002 12:48:31 PM

Count Time : 3600.0 seconds
Real Time : 3602.8 seconds
Dead Time : 0.08 %

Energy Calibration Used Done On : 7/01/02
Energy = -0.102 + 0.250*ch + -3.87E-008*ch^2 + 2.95E-012*ch^3

Corrections Applied:
None

Efficiency Calibration Used Done On : 8/13/02
Efficiency Geometry ID : 02S0210-019.001

Analyzed By: Marilyn Umbaugh Date: 8/15/02

Reviewed By: Larry Umbaugh Date: 8/15/02

50

****
***** Sample and QC Sample Results Summary *****
****

Site Sample ID : 02S0210-019.001

Analytical Batch ID : 0208124732

Sample Type (Result Identifier): G19

Lab Sample Number : CMLS-1593

Geometry ID : 02S0210-019.001

Filename: A:\G1900052.CNF

Detector Name: BEGE4732

MDA = Curie method as specified in Genie-2000 Customization Tools Manual Appendix B; Basic Algorithms.

Analyte	Activity (pCi/Grams)	2-Sigma Uncertainty (pCi/Grams)	MDA (pCi/Grams)
K-40	2.04E+001	5.40E+000	5.81E+000
CS-137	0.00E+000	0.00E+000	6.78E-001
TL-208	0.00E+000	0.00E+000	5.82E-001
PO-210	0.00E+000	0.00E+000	6.05E+004
BI-212	0.00E+000	0.00E+000	9.31E+000
PB-212	0.00E+000	0.00E+000	7.29E-001
BI-214	0.00E+000	0.00E+000	1.30E+000
PB-214	0.00E+000	0.00E+000	1.01E+000
RA-226	0.00E+000	0.00E+000	5.40E+000
AC-228	0.00E+000	0.00E+000	2.70E+000
TH-230	0.00E+000	0.00E+000	5.09E+001
Th-231	0.00E+000	0.00E+000	2.60E+000
PA-234	0.00E+000	0.00E+000	6.32E-001
PA-234M	0.00E+000	0.00E+000	8.08E+001
U-235	2.67E-001	2.06E-001	3.34E-001
U238/234	2.20E+000	1.81E+000	2.91E+000
AM-241	0.00E+000	0.00E+000	5.69E-001

SURVEY UNIT 991-B-007
RADIOLOGICAL DATA SUMMARY - PDS

Survey Unit Description: B992 (Exterior)

52

Total Surface Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-1.5		dpm/100 cm^2
MAX	82.9		dpm/100 cm^2
MEAN	33.8		dpm/100 cm^2
STD DEV	26.8		dpm/100 cm^2
TRANSURANIC DCGL$_W$	100		dpm/100 cm^2

Removable Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-0.3		dpm/100 cm^2
MAX	2.7		dpm/100 cm^2
MEAN	0.5		dpm/100 cm^2
STD DEV	0.9		dpm/100 cm^2
TRANSURANIC DCGL$_W$	20		dpm/100 cm^2

53

SURVEY UNIT 991-B-007
TSA - DATA SUMMARY

Manufacturer:	NE Electra	NE Electra	NE Electra	NE Electra	NE Electra
Model:	DP-6	DP-6	DP-6	DP-6	DP-6
Instrument ID#:	7	8	9	10	11
Serial #:	1379	1250	394	1271	1250
Cal Due Date:	11/20/02	10/10/02	1/12/03	2/1/03	10/10/02
Analysis Date:	7/22/02	7/22/02	7/22/02	8/7/02	8/7/02
Alpha Eff. (c/d):	0.173	0.213	0.226	0.211	0.213
Alpha Bkgd (cpm)	3.0	3.0	1.0	2.0	0.0
Sample Time (min)	1.5	1.5	1.5	1.5	1.5
LAB Time (min)	1.5	1.5	1.5	1.5	1.5
MDC (dpm/100cm^2)	48.0	48.0	48.0	48.0	48.0

Sample Location Number	Instrument ID#:	Sample Gross Counts (cpm)	Sample Gross Activity (dpm/100cm2)	LAB Gross Counts (cpm)	LAB Gross Activity (dpm/100cm2)	Sample Net Activity (dpm/100cm2)[1]
1	7	8.0	46.2	7.0	40.5	26.0
2	8	8.7	40.8	2.7	12.7	20.6
3	7	11.0	63.6	5.0	28.9	43.3
4	7	6.0	34.7	5.0	28.9	14.4
5	8	4.0	18.8	1.3	6.1	-1.5
6	9	4.7	20.8	1.3	5.8	0.5
7	7	15.0	86.7	2.0	11.6	66.5
8	7	8.0	46.2	8.0	46.2	26.0
9	9	10.7	47.3	5.3	23.5	27.1
10	7	16.0	92.5	5.3	30.6	72.2
11*	11	4.7	22.1	3.3	15.5	1.8
12	8	17.3	81.2	0.7	3.3	61.0
13	8	9.3	43.7	2	9.4	23.4
14	9	23.3	103.1	2.7	11.9	82.9
15	7	11.0	63.6	5.0	28.9	43.3
					20.2	Sample LAB Average
					MIN	-1.5
					MAX	82.9
					MEAN	33.8
					SD	26.8
					Transuranic $DCGL_W$	100

1 - Average LAB used to subtract from Gross Sample Activity

* - The initial Sample Net Activity for Sample Location 11 was 133.8 dpm/100cm2.

Location 11 was allowed to decay. The re-survey results are reported.

QC Measurements

13QC	9	8.0	35.4	1.0	4.4	21.2
5QC	9	8.0	35.4	5.4	23.9	21.2
					14.2	QC LAB Average
					Transuranic $DCGL_W$	100

1 - Average QC LAB used to subtract from Gross Sample Activity

54

SURVEY UNIT 991-B-007
RSC - DATA SUMMARY

Manufacturer:	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4
Instrument ID#:	1	2	3	4
Serial #:	824	851	963	966
Cal Due Date:	10/1/02	10/29/02	1/3/03	11/6/02
Analysis Date:	7/22/02	7/22/02	7/22/02	7/22/02
Alpha Eff. (c/d):	0.33	0.33	0.33	0.33
Alpha Bkgd (cpm)	0.0	0.0	0.2	0.1
Sample Time (min)	2	2	2	2
Bkgd Time (min)	10	10	10	10
MDC (dpm/100cm^2)	9.0	9.0	9.0	9.0

Sample Location Number	Instrument ID#	Gross Counts (cpm)	Net Activity (dpm/100 cm^2)
1	4	0	-0.2
2	1	0	0.0
3	2	1	1.5
4	3	2	2.7
5	4	0	-0.2
6	1	1	1.5
7	2	0	0.0
8	3	1	1.2
9	4	1	1.4
10	1	0	0.0
11	2	0	0.0
12	3	0	-0.3
13	4	0	-0.2
14	3	0	-0.3
15	4	0	-0.2
		MIN	-0.3
		MAX	2.7
		MEAN	0.5
		SD	0.9
		Transuranic DCGL$_W$	20

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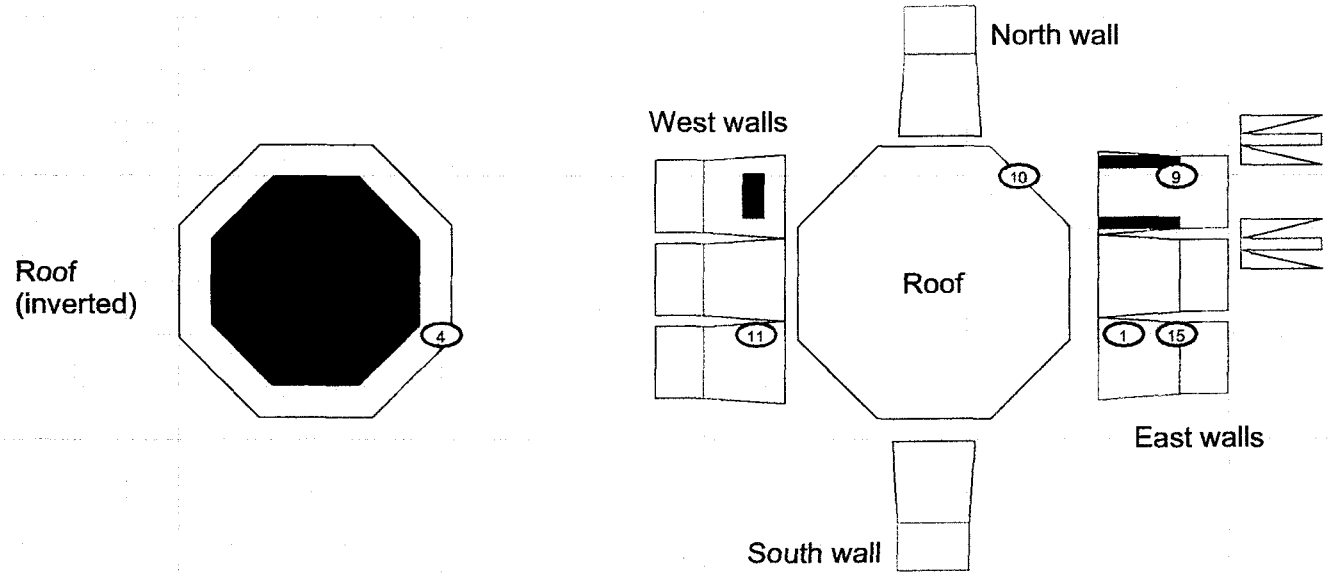
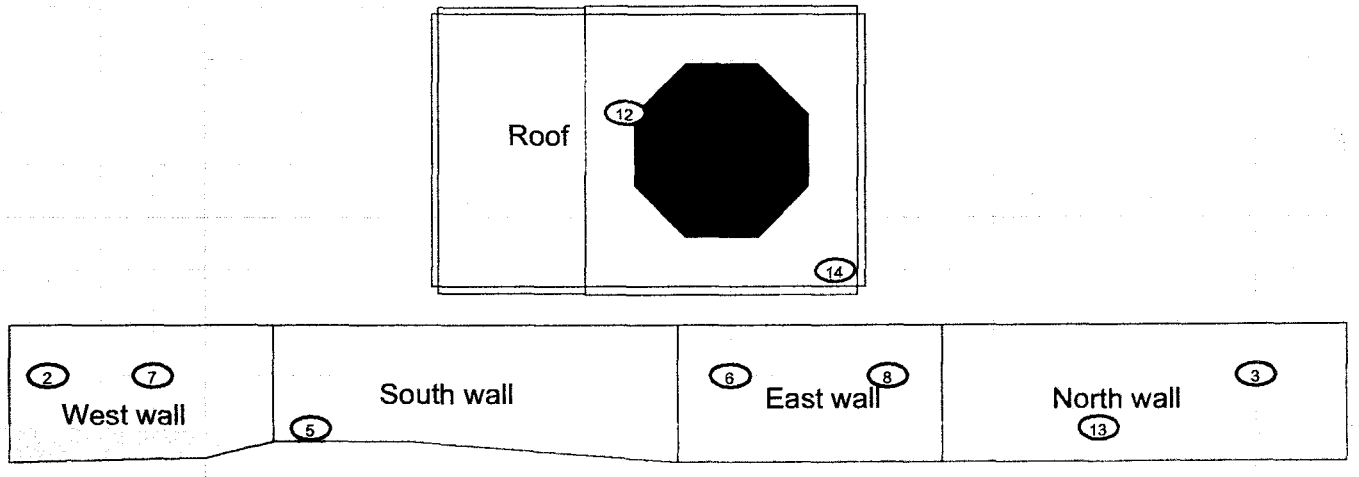
PRE-DEMOLITION SURVEY FOR 991 CLUSTER

Survey Area: B **Survey Unit: 991-B-007** **Classification: 3**
Building: 992
Survey Unit Description: Exterior of Building
Total Area: 160 sq. m. **Total Roof Area: 67 sq. m.**

Second level



First level



Scan Area

SURVEY MAP LEGEND

- Smear & TSA Location
- Smear, TSA & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15
0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

Scan Survey Information
Survey Instrument ID #(s): 7, 8, 9
RCT ID #(s): 1, 2, 4

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707 Prepared for:

DynCorp
THE ART OF TECHNOLOGY

KAISER HILL

MAP ID: 02-0335/B992-EX-SC July 31, 2002

SURVEY UNIT 991-B-008
RADIOLOGICAL DATA SUMMARY - PDS

Survey Unit Description: B993 (Exterior)

57

Total Surface Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	3.6		dpm/100 cm^2
MAX	147.5		dpm/100 cm^2
MEAN	71.0		dpm/100 cm^2
STD DEV	47.4		dpm/100 cm^2
TRANSURANIC DCGL$_W$	100		dpm/100 cm^2

Removable Activity Measurements

	15 Number Required	15 Number Obtained	
MIN	-0.3		dpm/100 cm^2
MAX	2.7		dpm/100 cm^2
MEAN	0.5		dpm/100 cm^2
STD DEV	0.9		dpm/100 cm^2
TRANSURANIC DCGL$_W$	20		dpm/100 cm^2

Five locations had initial alpha activity greater than the transuranic DCGL$_W$ (100dpm/100cm^2). A coupon sample was collected at the highest elevated activity location (#5) and analyzed using the Canberra ISOCS gamma spectroscopy system. Gamma spectroscopy results indicated only uranium contamination and other naturally occuring isotopes. No DOE-added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore no further investigation is required and all data meets the PDSP unrestricted release criteria.

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SURVEY UNIT 991-B-008
TSA - DATA SUMMARY

Manufacturer:	NE Electra	NE Electra	NE Electra	NE Electra	NE Electra
Model:	DP-6	DP-6	DP-6	DP-6	DP-6
Instrument ID#:	7	8	9	10	11
Serial #:	1260	1250	394	1379	1366
Cal Due Date:	8/27/02	10/10/02	1/12/03	11/20/02	2/1/03
Analysis Date:	7/22/02	7/22/02	7/22/02	7/22/03	8/7/02
Alpha Eff. (c/d):	0.221	0.213	0.226	0.173	3.000
Alpha Bkgd (cpm)	4.0	3.0	1.0	3.0	3.0
Sample Time (min)	1.5	1.5	1.5	1.5	1.5
LAB Time (min)	1.5	1.5	1.5	1.5	1.5
MDC (dpm/100cm^2)	48.0	48.0	48.0	48.0	48.0

Sample Location Number	Instrument ID#:	Sample Gross Counts (cpm)	Sample Gross Activity (dpm/100cm2)	LAB Gross Counts (cpm)	LAB Gross Activity (dpm/100cm2)	Sample Net Activity (dpm/100cm2)[1]
1	10	13.3	76.9	4.7	27.2	58.4
2*	7	30.7	138.9	1.3	5.9	120.5
3	8	8.7	40.8	4.7	22.1	22.4
4	9	5.3	23.5	2.0	8.8	5.0
5*	10	28.7	165.9	5.3	30.6	147.5
6	8	4.7	22.1	4.0	18.8	3.6
7	8	10.0	46.9	1.3	6.1	28.5
8*	7	30.0	135.7	0.0	0.0	117.3
9	10	14.7	85.0	1.3	7.5	66.5
10	10	14.0	80.9	3.3	19.1	62.5
11	10	18.0	104.0	8.0	46.2	85.6
12	10	13.3	76.9	4.0	23.1	58.4
13*	10	23.3	134.7	6.0	34.7	116.2
14*	7	34.0	153.8	0.0	0.0	135.4
15	9	12.7	56.2	6.0	26.5	37.8
					18.4	Sample LAB Average
					MIN	3.6
					MAX	147.5
					MEAN	71.0
					SD	47.4
					Transuranic DCGL$_W$	**100**

1 - Average LAB used to subtract from Gross Sample Activity

* Elevated Alpha activity was detected at these 5 locations.

Location	Initial dpm/100cm2
2	120.5
5	147.5
8	117.3
13	116.2
14	135.4

* The above locations had initial alpha activity greater than the transuranic DCGL$_W$ (100dpm/100cm^2). A coupon sample was collected at the highest elevated activity location (#5) and analyzed using the Canberra ISOCS gamma spectroscopy system. Gamma spectroscopy results indicated only uranium contamination and other naturally occuring isotopes. No DOE-added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore no further investigation is required and all data meets the PDSP unrestricted release criteria.

QC Measurements

3QC	9	12.7	56.2	4.0	17.7	45.7
15QC	8	16.0	75.1	0.7	3.3	64.6
					10.5	QC LAB Average
					Transuranic DCGL$_W$	**100**

1 - Average QC LAB used to subtract from Gross Sample Activity

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SURVEY UNIT 991-B-008
RSC - DATA SUMMARY

Manufacturer:	Eberline	Eberline	Eberline	Eberline
Model:	SAC-4	SAC-4	SAC-4	SAC-4
Instrument ID#:	1	2	3	4
Serial #:	824	851	963	**966**
Cal Due Date:	10/1/02	10/29/02	1/3/03	**11/6/02**
Analysis Date:	7/22/02	7/22/02	7/22/02	**7/22/02**
Alpha Eff. (c/d):	0.33	0.33	0.33	**0.33**
Alpha Bkgd (cpm)	0.0	0.0	0.2	**0.1**
Sample Time (min)	2	2	2	**2**
Bkgd Time (min)	10	10	10	**10**
MDC (dpm/100cm^2)	9.0	9.0	9.0	**9.0**

Sample Location Number	***Instrument ID#***	**Gross Counts (cpm)**	**Net Activity (dpm/100 cm^2)**
1	1	1	1.5
2	2	0	0.0
3	3	0	-0.3
4	4	1	1.4
5	1	0	0.0
6	2	1	1.5
7	3	0	-0.3
8	4	0	-0.2
9	1	0	0.0
10	2	0	0.0
11	3	2	2.7
12	4	1	1.4
13	1	0	0.0
14	2	0	0.0
15	3	0	-0.3
		MIN	-0.3
		MAX	2.7
		MEAN	0.5
		SD	0.9
		Transuranic DCGL$_W$	**20**

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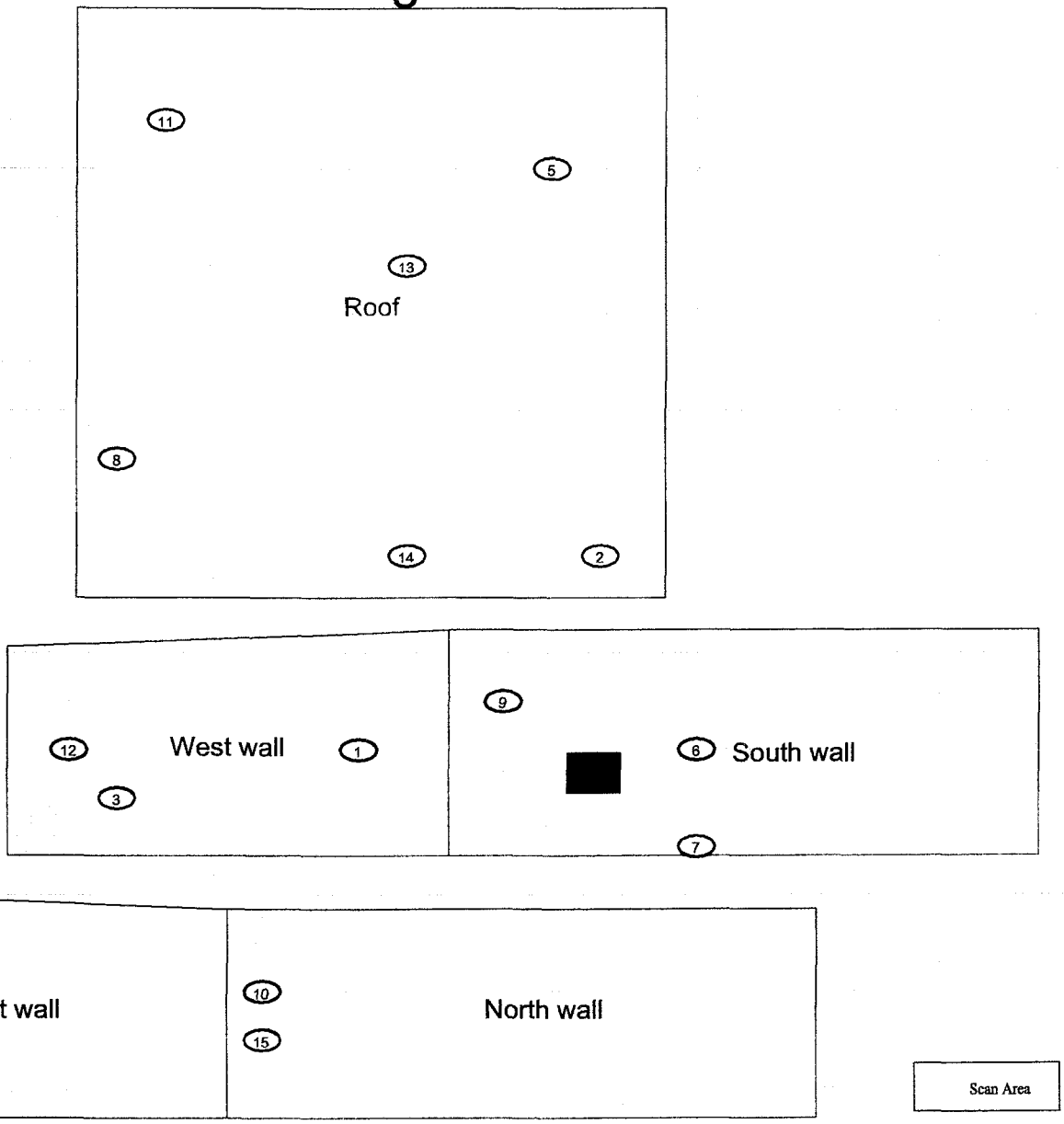
PRE-DEMOLITION SURVEY FOR 991 CLUSTER

Survey Area: B **Survey Unit: 991-B-008** **Classification: 3**
Building: 993
Survey Unit Description: Exterior of Building
Total Area: 340 sq. m. **Total Roof Area: 148 sq. m.**

Building 993



SURVEY MAP LEGEND

- (#) Smear & TSA Location
- (#) Smear, TSA & Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15
0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

Scan Survey Information
Survey Instrument ID #(s): 1, 2, 3
RCT ID #(s): 7, 8, 9

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707
DynCorp
THE ART OF TECHNOLOGY

Prepared for:
KAISER-HILL

MAP ID: 02-0355/B993-EX-SC **August 12, 2002**

SURVEY UNIT 991-B-008
CANBERRA GAMMA SPECTROSCOPY RESULTS

Survey Unit Description: B993 (Exterior)

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CANBERRA

Analysis Results Header 8/15/2002 11:00:36 AM Page 1

```
**************************************************************************
*****       G A M M A   S P E C T R U M   A N A L Y S I S        *****
** C a n b e r r a  M o b i l e  L a b o r a t o r y  S e r v i c e s **
**************************************************************************
```

Report Generated On : 8/15/2002 11:00:36 AM

RIN Number : 02S0210
Analytical Batch ID : 0208124732
Line Item Code : RC10B019

Filename: A:\G1900052.CNF

Sample Number : 02S0210-019.001
Lab Sample Number : CMLS-1593
Sample Receipt Date : 8/12/2002
Sample Volume Received : 2.23E+001 Grams

Result Identifier : N/A

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 100 - 8192
Peak Area Range (in channels) : 100 - 8192
Identification Energy Tolerance : 1.000 keV

Sample (Final Aliquot Size) : 2.234E+001 Grams
Sample Quantity Error : 0.000E+000
Systematic Error Applied : 0.000E+000

Sample Taken On : 8/09/2002 2:45:00 PM
Acquisition Started : 8/13/2002 12:48:31 PM

Count Time : 3600.0 seconds
Real Time : 3602.8 seconds
Dead Time : 0.08 %

Energy Calibration Used Done On : 7/01/02
Energy = -0.102 + 0.250*ch + -3.87E-008*ch^2 + 2.95E-012*ch^3

Corrections Applied:
None

Efficiency Calibration Used Done On : 8/13/02
Efficiency Geometry ID : 02S0210-019.001

Analyzed By: Marilyn Umbaugh Date: 8/15/02

Reviewed By: Larry Umbaugh Date: 8/15/02

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****
***** Sample and QC Sample Results Summary *****
****

Site Sample ID : 02S0210-019.001

Analytical Batch ID : 0208124732

Sample Type (Result Identifier): G19

Lab Sample Number : CMLS-1593

Geometry ID : 02S0210-019.001

Filename: A:\G1900052.CNF

Detector Name: BEGE4732

MDA = Curie method as specified in Genie-2000 Customization Tools Manual Appendix B; Basic Algorithms.

Analyte	Activity (pCi/Grams)	2-Sigma Uncertainty (pCi/Grams)	MDA (pCi/Grams)
K-40	2.04E+001	5.40E+000	5.81E+000
CS-137	0.00E+000	0.00E+000	6.78E-001
TL-208	0.00E+000	0.00E+000	5.82E-001
PO-210	0.00E+000	0.00E+000	6.05E+004
BI-212	0.00E+000	0.00E+000	9.31E+000
PB-212	0.00E+000	0.00E+000	7.29E-001
BI-214	0.00E+000	0.00E+000	1.30E+000
PB-214	0.00E+000	0.00E+000	1.01E+000
RA-226	0.00E+000	0.00E+000	5.40E+000
AC-228	0.00E+000	0.00E+000	2.70E+000
TH-230	0.00E+000	0.00E+000	5.09E+001
Th-231	0.00E+000	0.00E+000	2.60E+000
PA-234	0.00E+000	0.00E+000	6.32E-001
PA-234M	0.00E+000	0.00E+000	8.08E+001
U-235	2.67E-001	2.06E-001	3.34E-001
U238/234	2.20E+000	1.81E+000	2.91E+000
AM-241	0.00E+000	0.00E+000	5.69E-001

ATTACHMENT D

Chemical Data Summaries and Sample Maps

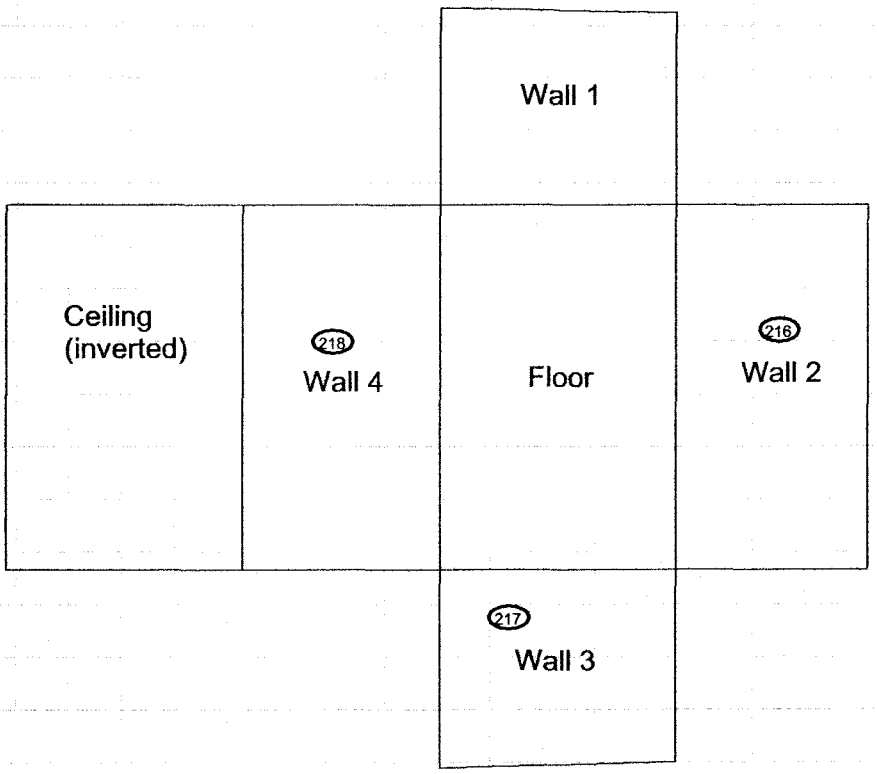
Asbestos Data Summary

Sample Number	Map Survey Point Location	Material Sampled & Location	Analytical Results
		Building 992	
992-06262002-315-202	**202**	***First floor – Light green transite wall panel***	**27% Chrysotile**
992-06262002-315-203	203	First floor – Green and white 12" vinyl floor tile with black mastic, SE corner	*Trace Chrysotile; <0.25% by Point Count*
992-06262002-315-204	204	First floor – White and tan 12" vinyl floor tile with dark brown mastic, SE corner	None Detected
992-06262002-315-205	205	First floor – Black base cove with black mastic, SE corner	None Detected
992-06262002-315-206	206	First floor – White paint on CMU, west wall	None Detected
992-06262002-315-207	207	First floor – White paint on CMU, west wall	None Detected
992-06262002-315-208	**208**	**Second floor – Tan 9" vinyl floor tile with black mastic**	**Tile, 15% Chrysotile; Mastic, None Detected**
992-06262002-315-209	**209**	**Second floor – Tan 9" vinyl floor tile with black mastic**	**Tile, 15% Chrysotile; Mastic, None Detected**
992-06262002-315-210	**210**	**Second floor – Exterior AC insulation with black fibrous tar and silver paint**	**25% Chrysotile**
992-06262002-315-211	211	Second floor – Tan stucco exterior wall	None Detected
992-06262002-315-212	212	Second floor – Tan stucco exterior wall	None Detected
992-06262002-315-213	213	Second floor – Tan base cove with brown mastic	None Detected
992-06262002-315-214	**214**	**First Floor – Window caulking, north window**	**2% Chrysotile; 2.5% by Point Count**
992-06262002-315-215	215	First floor – Window caulking, east window	None Detected
		Building 989	
989-06262002-315-216	216	Beige paint on CMU, east wall	None Detected
989-06262002-315-217	217	Beige paint on CMU, south wall	None Detected
989-06262002-315-218	218	TSI white fitting < 6" OD, west wall	None Detected
989-06262002-315-219	219	Gray textured paint, west exterior wall	None Detected
989-06262002-315-220	220	Gray textured paint, east exterior wall	None Detected
		Building 993	
993-0622002-315-221	221	Bead window caulking at base of window, west exterior wall	*Trace Chrysotile; 0.5% by Point Count*

CHEMICAL SAMPLE MAP

Building: 989

B989



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: GIS Dept. 303-966-7707

DynCorp
THE ART OF TECHNOLOGY

Prepared for: KAISER HILL

MAP ID: 02-355/989-IN

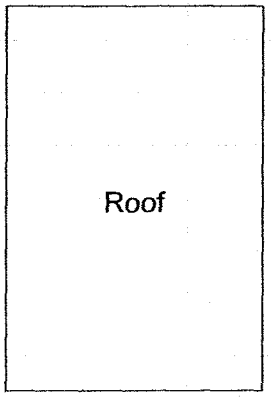
August 8, 2002

67

CHEMICAL SAMPLE MAP

Building: 989

B989



(219) West wall	South wall	(220) East wall	North wall

SURVEY MAP LEGEND

- (#) Asbestos Sample Location
- ⟨#⟩ Beryllium Sample Location
- [#] Lead Sample Location
- ◇ RCRA/CERCLA Sample Location
- (#) PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

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DynCorp
THE ART OF TECHNOLOGY

Prepared for: KAISER HILL

MAP ID: 02-0355/B989-EX

August 8, 2002

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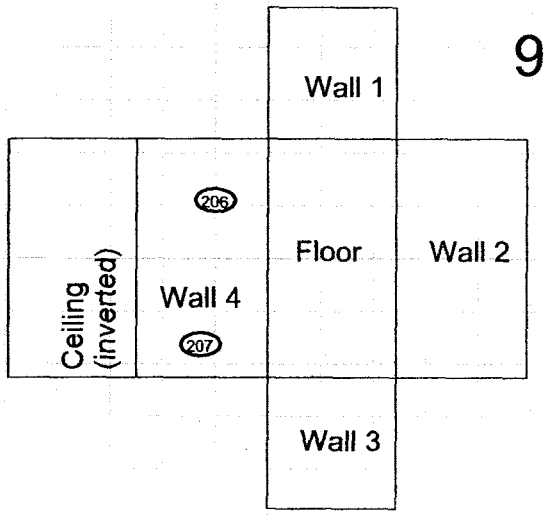
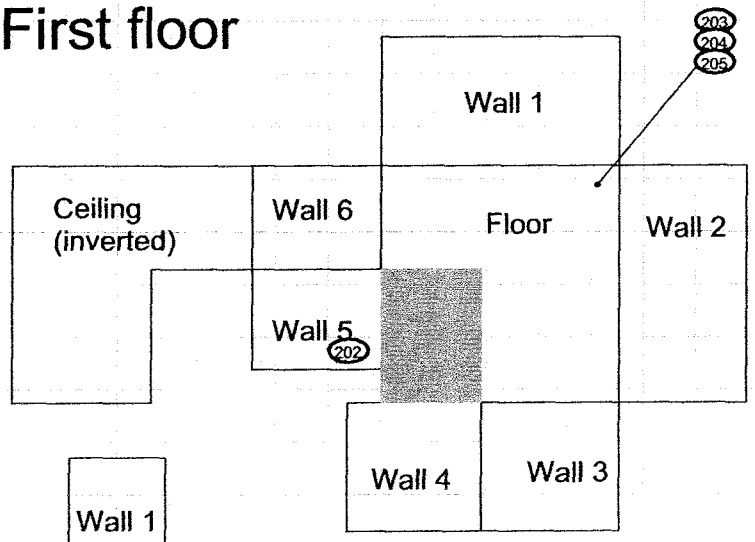
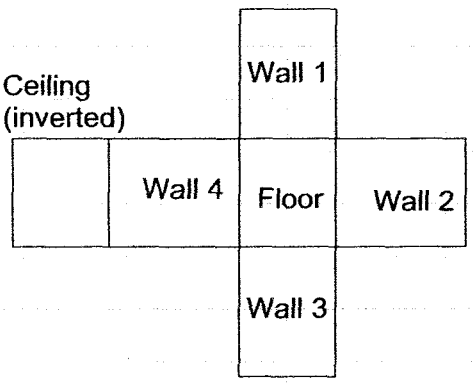
CHEMICAL SAMPLE MAP

Building: 992

992 First floor

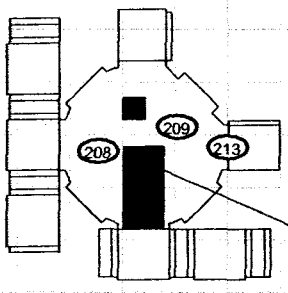


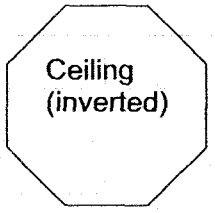




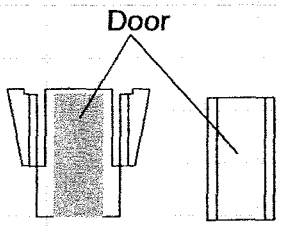
992 Second floor

Floor and lower walls

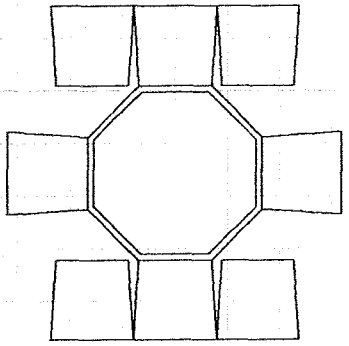




Ladder to 2nd floor



Shelf and upper windows



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

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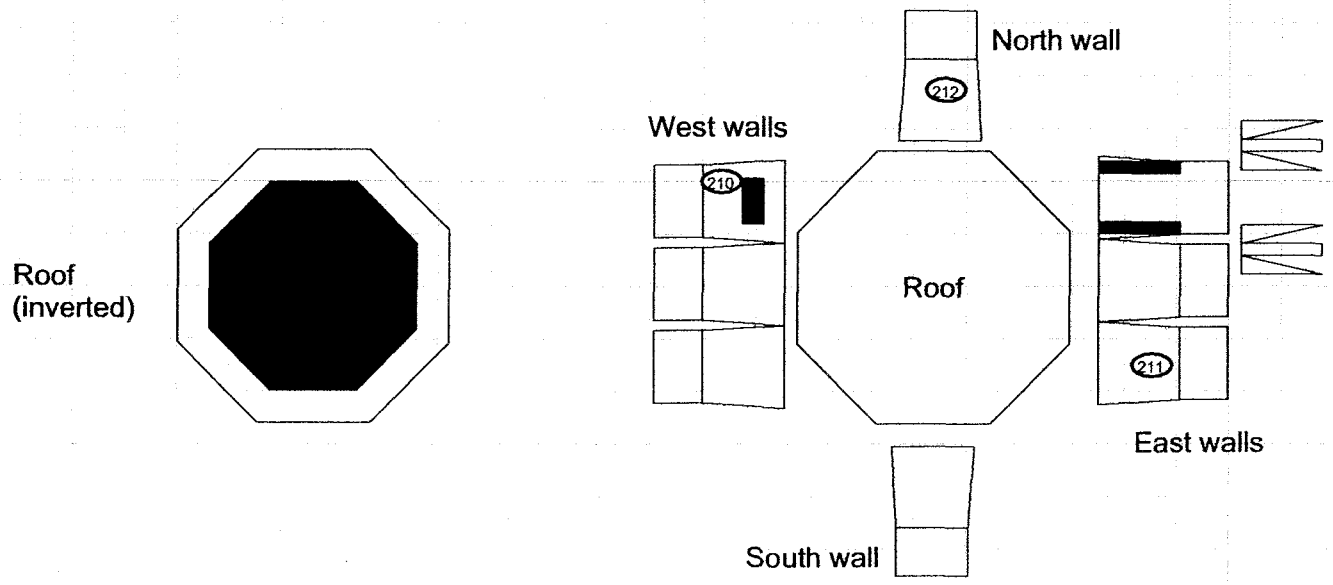
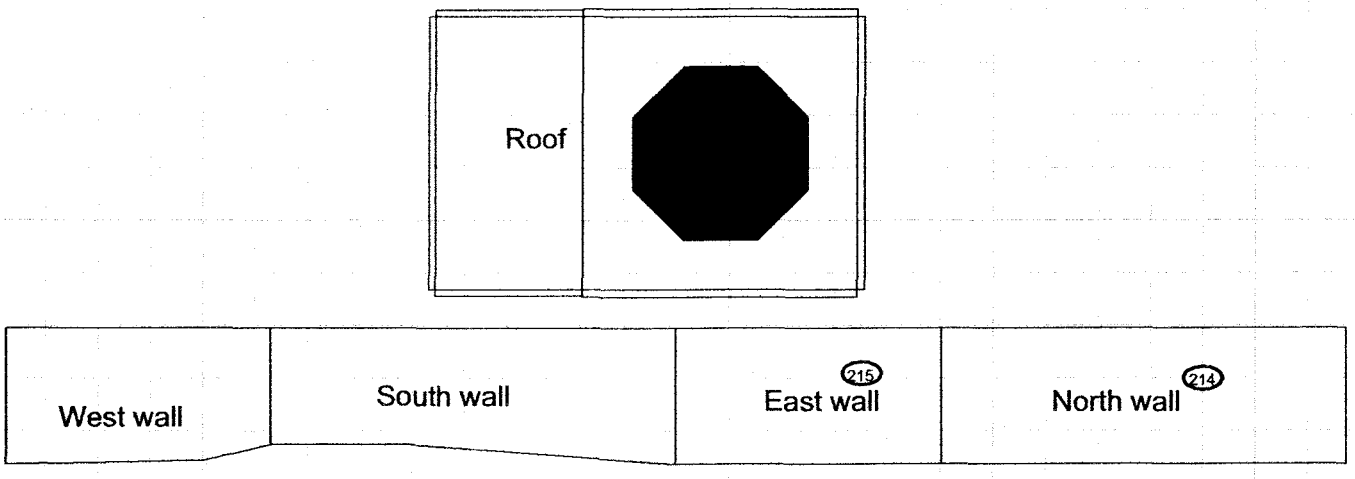
CHEMICAL SAMPLE MAP

Building: 992

Second level



First level



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

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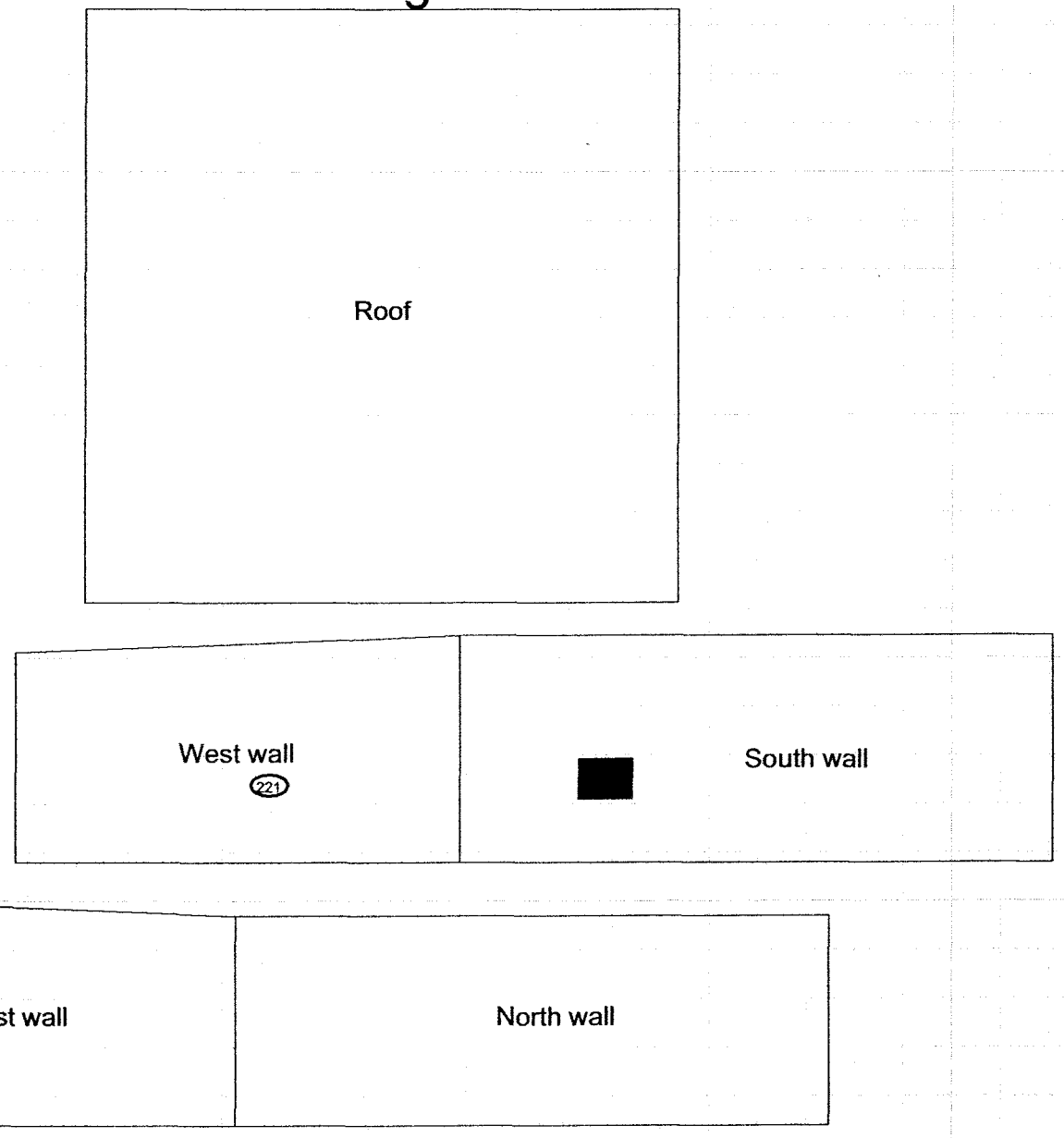
CHEMICAL SAMPLE MAP

Building: 993

Building 993



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

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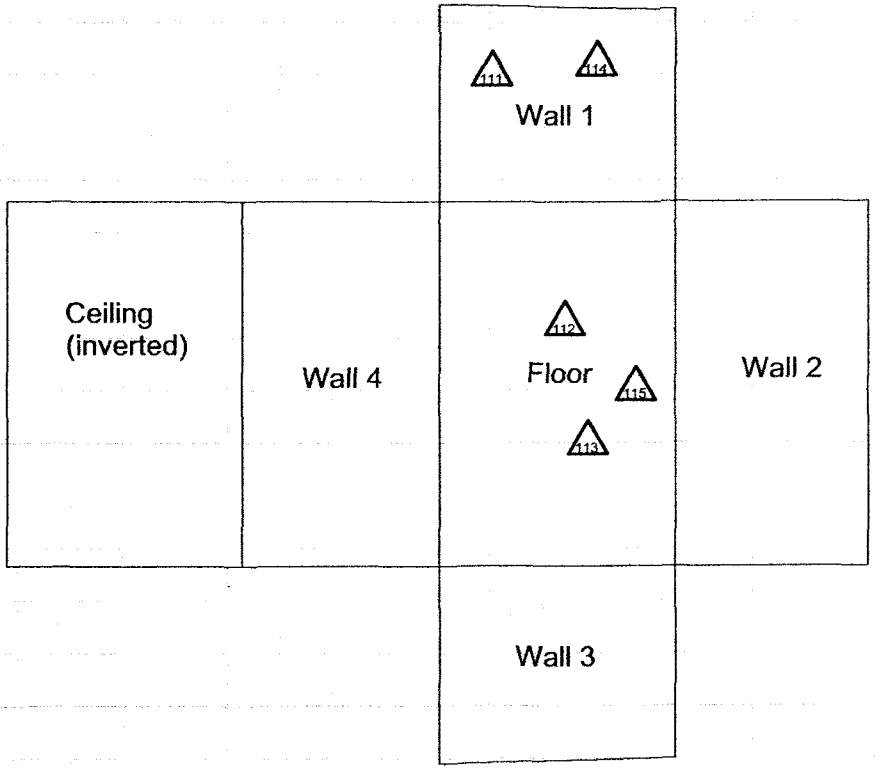
Beryllium Data Summary

Sample Number	Map Survey Point Location	Sample Location	Result ($\mu g/100\ cm^2$)
Building 992			
992-06262002-315-106	106	First floor – Top of green tile, SE corner	< 0.1
992-06262002-315-107	107	First floor – Top of white tile, middle of room	< 0.1
992-06262002-315-108	108	First floor – By lockers on concrete floor	< 0.1
992-06262002-315-109	109	Second floor – Top of electric heater, east wall	< 0.1
992-06262002-315-110	110	Second floor – Wooden shelf, west wall	< 0.1
Building 989			
989-06262002-315-111	111	Top of J-Box, north wall	< 0.1
989-06262002-315-112	112	Top of KATO AC generator	< 0.1
989-06262002-315-113	113	Top of green Brine Supply pipe	< 0.1
989-06262002-315-114	114	Top of Generator Control Panel, north wall	< 0.1
989-06262002-315-115	115	Top of Plexi-glass case over battery bank, east wall	< 0.1
Building 993			
993-06272002-315-116	116	Top of horizontal I-beam brace, middle of north wall	< 0.1
993-06272002-315-117	117	Top of horizontal I-beam brace, middle of north wall	< 0.1
993-06272002-315-118	118	Top of "Disc.16 -- 480 V Heater" electrical box, west wall	< 0.1
993-06272002-315-119	119	Top of horizontal I-beam brace, middle of south wall	< 0.1
993-06272002-315-120	120	Top of horizontal I-beam brace, middle of south wall	< 0.1

CHEMICAL SAMPLE MAP

Building: 989

B989



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

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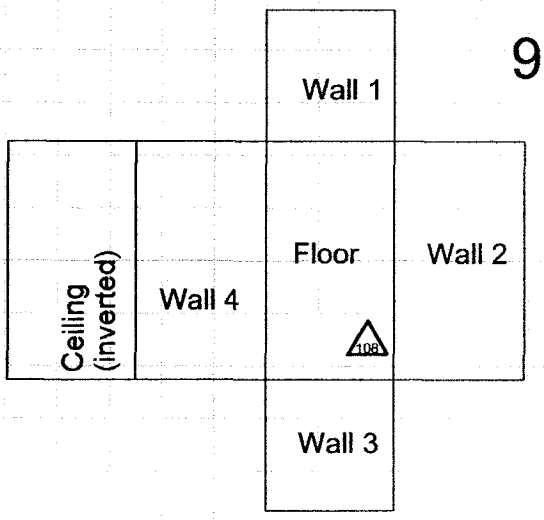
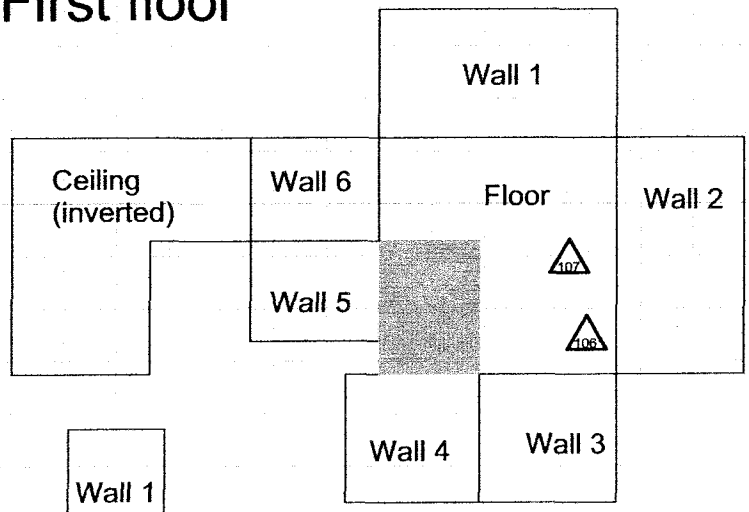
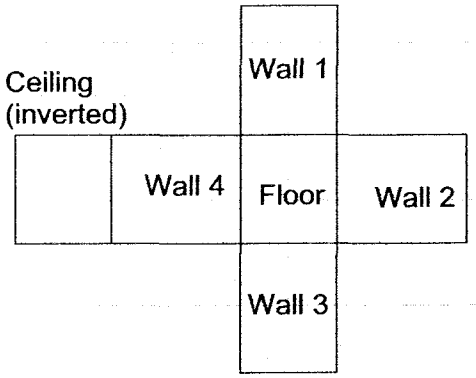
CHEMICAL SAMPLE MAP

Building: 992

992 First floor

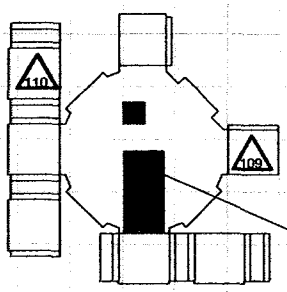


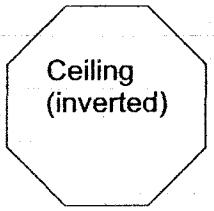


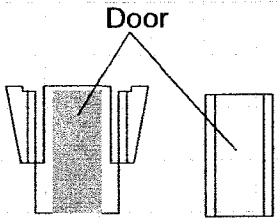


992 Second floor

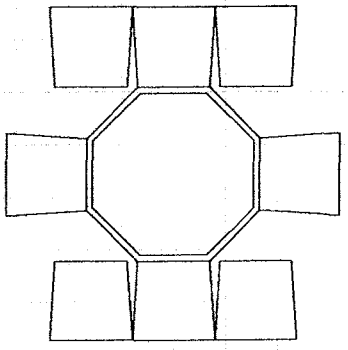
Floor and lower walls







Shelf and upper windows



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 15

0 METERS 5

1 inch = 12 feet 1 grid sq. = 1 sq. m.

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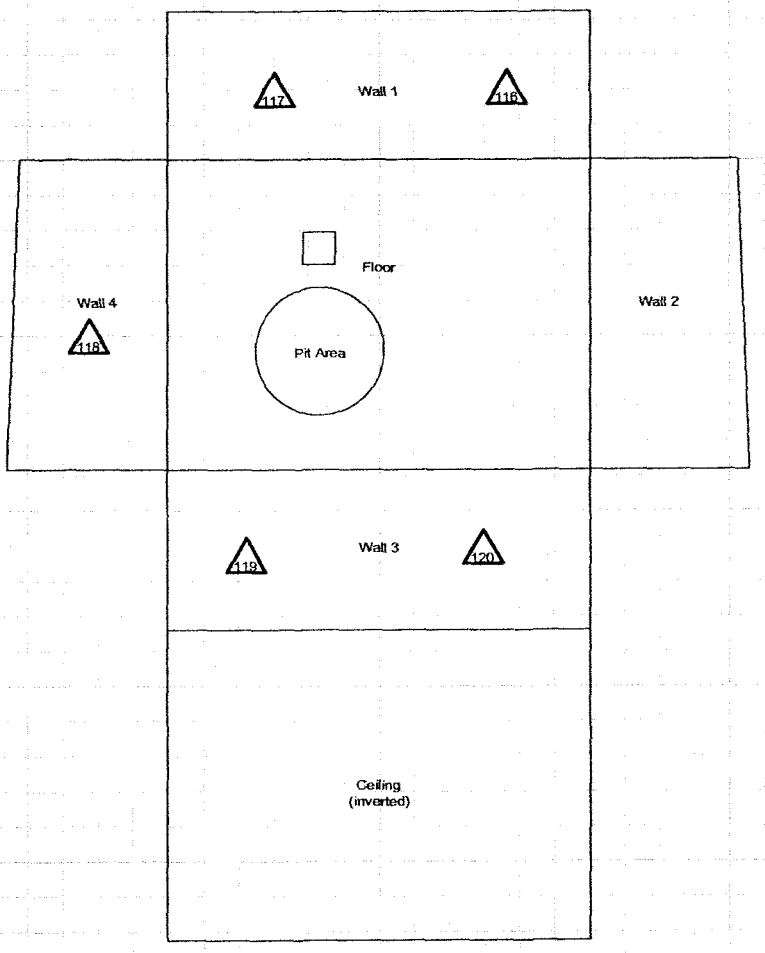
CHEMICAL SAMPLE MAP

Building: 993

Building 993



SURVEY MAP LEGEND

- Asbestos Sample Location
- Beryllium Sample Location
- Lead Sample Location
- RCRA/CERCLA Sample Location
- PCB Sample Location
- Open/Inaccessible Area
- Area in Another Survey Unit

N

0 FEET 25

0 METERS 8

1 inch = 18 feet 1 grid sq. = 1 sq. m.

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August 8, 2002

ATTACHMENT E

Data Quality Assessment (DQA) Detail

DATA QUALITY ASSESSMENT (DQA)

VERIFICATION & VALIDATION OF RESULTS

V&V of the data confirm that appropriate quality controls are implemented throughout the sampling and analysis process, and that any substandard controls result in qualification or rejection of the data in question. The required quality controls and their implementation are summarized in a tabular, checklist format for each category of data – radiological surveys and chemical analyses (specifically asbestos and beryllium).

DQA criteria and results are provided in a tabular format for each suite of surveys or chemical analyses performed; the radiological survey assessment is provided in Table E-1, asbestos in E-2 and beryllium in E-3. A data completeness summary for all results is given in Table E-4.

All relevant Quality records supporting this report are maintained in the RISS Characterization Project Files. This report will be submitted to the CERCLA Administrative Record for permanent storage within 30 days of approval by the Regulators. All radiological data are organized into Survey Packages, which correlate to unique (MARSSIM) Survey Units. Chemical data are organized by RIN (Report Identification Number) and are traceable to the sample number and corresponding sample location.

Beta/gamma survey designs were not implemented for the 989, 992, and 993 facilities based on the conservatism of the transuranic limits used as DCGLs in the unrestricted release decision process. Stated differently, based on the well-established suite of actinides historically used at the RFETS, all of these actinides would emit alpha radiation in exceedance of the applicable transuranic DCGLs before other DCGLs would be exceeded for their respective Uranium species – Technical Basis Document 00162, Rev. 0, *Technical Justification for Types of Surveys Performed During Reconnaissance Level Characterization Surveys and Pre-Demolition Surveys in RISS Facilities,* corroborates the use of this approach.

Consistent with EPA's G-4 DQO process, the radiological survey design (for those survey units performed per PDS requirements) was optimized by checking actual measurement results (acquired during pre-demolition surveys) against model output with original estimates. Use of actual sample/survey (result) variances in the MARSSIM DQO model confirms that an adequate number of surveys were acquired.

SUMMARY

In summary, the data presented in this report have been verified and validated relative to the quality requirements and project decisions as stated in the original DQOs. All data are useable based on qualifications stated herein and are considered satisfactory without qualification. All media surveyed and sampled yielded results less than their associated action levels and with acceptable uncertainties, except the following anomalies and/or contaminated areas:

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- Five sample locations (#'s 202, 208, 209, 210 and 214) were identified in B992 containing Category 1 and 2 non-friable asbestos containing building materials. These locations will be abated prior to demolition. No asbestos containing building materials are located in Buildings 989 and 993.
- Elevated alpha activity was identified on the metal flashing of west wall exterior of B989 at survey location #13 (116.2 dpm/100cm^2) greater than the transuranic $DCGL_W$ (100 dpm/100cm^2). A coupon sample was taken and analyzed by gamma spectroscopy, results indicated only uranium contamination and other naturally occurring isotopes. No DOE-Added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore, no further investigation is required.
- Initial elevated alpha activity at five survey locations (#'s 2, 5, 8, 13 and 14) was detected on the roof exterior of B993 greater than the transuranic $DCGL_W$ (100 dpm/100cm^2). A coupon sample was taken at the location with the highest net activity (#5 – 147.5 dpm/100cm^2) and analyzed by gamma spectroscopy. Gamma spectroscopy results indicated only uranium contamination and other naturally occurring isotopes. No DOE-Added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore, no further investigation is required.
- Initial elevated alpha activity was detected on the roof of B992 at survey location #11 (133.8 dpm/100cm^2) that exceeded the $DCGL_W$ (100 dpm/100cm^2) unrestricted release limits. The location was allowed to decay per RSP 16.02 requirements and resurveyed. Net activity for the re-survey (1.8 dpm/100cm^2) was below the $DCGL_W$ (100 dpm/100cm^2) unrestricted release limits. This re-survey value is reported in Attachment C *Radiological Data Summaries and Survey Maps*.
- The standard Deviation for B993 exterior, survey unit 991-B-008 was > 30 (actual standard deviation of 30.5.) The data point calculation was recalculated using the actual standard deviation value of 30.5 as the sigma and determined that a sufficient number of samples (15) were taken in accordance with MARSSIM guidelines. Additionally, the original sample quantity of 15 included a 20% correction factor thereby ensuring an adequate number of samples taken.

Chain of Custody was intact; documentation was complete, hold times were acceptable (when applicable,) and packaging integrity/custody seals were maintained throughout the sampling/analysis process. Level 2 Isolation Control signs will be posted to prevent the inadvertent introduction of radioactive materials. On this basis, the Survey Units and facilities identified in this RLCR meet the unrestricted release criteria with the confidences stated herein.

Table E-1 V&V of Radiological Surveys

V&V CRITERIA, RADIOLGICAL SURVEYS		K-H RSP 16.00 Series MARSSIM (NUREG-1575)		
QUALITY REQUIREMENTS				
	Parameters	Measure	frequency	COMMENTS
ACCURACY	initial calibrations	90%<x<110%	≥1	Multi-point calibration through the measurement range encountered in the field; programmatic records.
	daily source checks	80%<x<120%	≥1/day	Performed daily/within range.
	local area background: Field	typically < 10 dpm	≥1/day	All local area backgrounds were within expected ranges (i.e., no elevated anomalies.)
PRECISION	field duplicate measurements for TSA	≥5% of real survey points	≥10% of reals	N/A
REPRESENTATIVENESS	MARSSIM gridding methodology (Survey Units: 991-A-002, 991-A-003, 991-A-004, 991-B-006, 991-B-007 and 991-B-008)	statistical and biased	NA	Random w/ statistical confidence.
	Survey Maps	NA	NA	Random and biased measurement locations controlled/mapped to ±1m.
	Controlling Documents (Characterization Pkg; RSPs)	qualitative	NA	Refer to the Characterization Package (planning document) for field/sampling procedures (located in Project files); thorough documentation of the planning, sampling/analysis process, and data reduction into formats.
COMPARABILITY	units of measure	dpm/100cm^2	NA	Use of standardized engineering units in the reporting of measurement results.
COMPLETENESS	Plan vs. Actual surveys usable results vs. unusable	>95% >95%	NA	See Table E-4 for details.
SENSITIVITY	detection limits	TSA: ≤50 dpm/100cm^2 RA: ≤10 dpm/100cm^2	all measures	MDAs ≤ 50% DCGL$_w$ per MARSSIM guidelines. RLC performed to PDS criteria.

Table E-2 V&V Of Chemical Results-Asbestos

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		
ASBESTOS	METHOD: EPA 600/R-93/116	LAB ---->	Reservoirs Environmental, Inc	
QUALITY REQUIREMENT		RIN ---->	RIN02D1442	
		Measure	Frequency	COMMENTS
ACCURACY	Calibrations: Initial/continuing	below detectable amounts	≥1	Semi-quantitative, per (microscopic) visual estimation.
PRECISION	Actual Number Sampled LCSD Lab duplicates	all below detectable amounts	≥ 20 samples	Semi-quantitative, per (microscopic) visual estimation.
REPRESENTATIVENESS	COC	Qualitative	NA	Chain-of-Custody intact: completed paperwork, containers w/ custody seals.
	Hold times/preservation	Qualitative	NA	N/A
	Controlling Documents (Plans, Procedures, maps, etc.)	Qualitative	NA	See original Chemical Characterization Package (planning document); for field/sampling procedures (located in project file;) thorough documentation of the planning, sampling/analysis process, and data reduction into formats.
COMPARABILITY	Measurement Units	% by bulk volume	NA	Use of standardized engineering units in the reporting of measurement results.
COMPLETENESS	Plan vs. Actual samples Usable results vs. unusable	Qualitative	NA	See Table E-4; final number of samples at Certified Inspector's discretion.
SENSITIVITY	Detection limits	<1% by volume	all measures	N/A

Table E-3 V&V Of Chemical Results-Beryllium

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		
BERYLLIUM	Prep: NMAM 7300 METHOD: OSHA ID-125G	LAB ---->	Johns Manville, Littleton, Co.	
QUALITY REQUIREMENTS		RIN ---->	RIN02D1443	
		Measure	frequency	COMMENTS
ACCURACY	Calibrations Initial	linear calibration	≥1	No qualifications significant enough to change project decisions, i.e., classification of Type 1 facility confirmed. All results were below associated action levels.
	Continuing	80%<%R<120%	≥1	
	LCS/MS	80%<%R<120%	≥1	
	Blanks - lab & field	<MDL	≥1	
	interference check std (ICP)	NA	NA	
PRECISION	LCSD	80%<%R<120% (RPD<20%)	≥1	
	field duplicate	all results < RL	≥1	
REPRESENTATIVENESS	COC	Qualitative	NA	
	hold times/preservation	Qualitative	NA	
	Controlling Documents (Plans, Procedures, maps, etc.)	Qualitative	NA	
COMPARABILITY	measurement units	ug/100cm^2	NA	
COMPLETENESS	Plan vs. Actual samples usable results vs. unusable	>95% >95%	NA	
SENSITIVITY	detection limits	MDL of 0.012 ug/100cm^2	all measures	

Table E-4 Data Completeness Summary

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC)[A]	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Asbestos	Building 989 (interior and exterior)	5 biased (interior and exterior)	5 biased (3 interior/2 exterior)	No ACM present, all results < 1% by volume	40 CFR763.86; 5 CCR 1001-10; EPA 600/R-93/116 RIN02D1442
Asbestos	Building 992 (interior and exterior)	14 biased (interior and exterior)	14 real (9 interior/5 exterior)	ACM present > 1% by volume (5 sample locations)	40 CFR763.86; 5 CCR 1001-10; EPA 600/R-93/116 RIN02D1442 Sample locations #'s 202, 208, 209, 210 and 214 > 1% ACM by volume (2% to 25% Chrysotile by volume.) Location #214 was also < 2.5 point count.
Asbestos	Building 993 (exterior)	1 biased (exterior)	1 real (exterior)	No ACM present, all results < 1% by volume	40 CFR763.86; 5 CCR 1001-10; EPA 600/R-93/116 RIN02D1442
Beryllium	Building 989 (interior)	5 biased (interior)	5 real (interior)	No contamination found at any location	OSHA ID-125G – RIN02D1443 No results above action level (0.2ug/100cm^2) or investigative level (0.1 ug/100cm^2).
Beryllium	Building 992 (interior)	5 biased (interior)	5 real (interior)	No contamination found at any location	OSHA ID-125G – RIN02D1443 No results above action level (0.2ug/100cm^2) or investigative level (0.1 ug/100cm^2).
Beryllium	Building 993 (interior)	5 biased (interior)	5 real (interior)	No contamination found at any location	OSHA ID-125G – RIN02D1443 No results above action level (0.2ug/100cm^2) or investigative level (0.1 ug/100cm^2).
Radiological	Survey Area A Survey Unit: 991-A-002 B989 (interior)	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	No contamination at any location; all values below unrestricted release levels	No results above $DCGL_W$ or $DCGL_{EMC}$ action level (20 dpm/100cm^2 removable, 100 dpm/100cm^2 average, and 300 dpm/100cm^2 maximum).

Table E-4 Data Completeness Summary

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC)[A]	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Radiological	Survey Area B Survey Unit: 991-B-006 B989 (exterior)	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	No contamination at any location; all values below unrestricted release levels	No results above $DCGL_W$ or $DCGL_{EMC}$ action level (20 dpm/100cm^2 removable, 100 dpm/100cm^2 average, and 300 dpm/100cm^2 maximum). Elevated activity (TSA) at sample location #13 (116.2 dpm/100cm^2) greater than the $DCGL_W$ (100 dpm/100cm^2.) One coupon sample was taken and analyzed using gamma spectroscopy. Gamma spectroscopy results indicated only uranium contamination and other naturally occurring isotopes. No DOE-Added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore, no further investigation is required.
Radiological	Survey Area A Survey Unit: 991-A-003 B992 (interior)	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	No contamination at any location; all values below unrestricted release levels	No results above $DCGL_W$ or $DCGL_{EMC}$ action level (20 dpm/100cm^2 removable, 100 dpm/100cm^2 average, and 300 dpm/100cm^2 maximum).
Radiological	Survey Area A Survey Unit: 991-A-004 B993 (interior)	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	No contamination at any location; all values below unrestricted release levels	No results above $DCGL_W$ or $DCGL_{EMC}$ action level (20 dpm/100cm^2 removable, 100 dpm/100cm^2 average, and 300 dpm/100cm^2 maximum).

Table E-4 Data Completeness Summary

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC)[A]	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Radiological	Survey Area B Survey Unit: 991-B-007 B992 (exterior)	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	No contamination at any location; all values below unrestricted release levels	No results above $DCGL_W$ or $DCGL_{EMC}$ action level (20 dpm/100cm^2 removable, 100 dpm/100cm^2 average, and 300 dpm/100cm^2 maximum). Initial elevated alpha activity @ sample location #11 (133.8 dpm/100cm^2) that exceeded the $DCGL_W$ (100dpm/100cm^2). The location was allowed to decay per RSP 16.02 requirements and resurveyed. Net activity for the re-survey was below the $DCGL_W$ 100 dpm/100cm^2 (1.8 dpm/100cm^2). This re-survey value is reported in Attachment C.
Radiological	Survey Area B Survey Unit: 991-B-008 B993 (exterior)	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	15 á TSA and 15 á Smears (random) 2 QC TSA 5% scan	No contamination at any location; all values below unrestricted release levels	No results above $DCGL_W$ or $DCGL_{EMC}$ action level (20 dpm/100cm^2 removable, 100 dpm/100cm^2 average, and 300 dpm/100cm^2 maximum). Initial elevated alpha activity at 5 sample locations (#'s 2, 5, 8, 13 and 14) greater than the $DCGL_W$ (100dpm/100cm^2). One coupon sample was taken at the location with the highest net activity (#5 – 147.5 dpm/100cm^2) and analyzed by gamma spectroscopy. Gamma spectroscopy results indicated only uranium contamination and other naturally occurring isotopes. No DOE-Added isotope activity was greater than the applicable unrestricted release levels (transuranic or uranium), therefore, no further investigation is required.

[A] Number of asbestos samples required is an estimate only, final number of samples is at the discretion of the IH.